The Monthly Review of the AMERICAN ELECTROPLATERS' SOCIETY

E M Baker

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NOVEMBER 1940

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The Monthly Review

Published by the
AMERICAN ELECTROPLATERS' SOCIETY, INC.

Publication and Editorial Office
93 Oak Grove Ave.
Springfield, Massachusetts

VOL. XXVII NOVEMBER 1940 NO. 11

Editorial

On Hallowe'en, we took a few minutes off from our job of answering the doorbell and handing out candy, to go to the corner and mail a letter. On the way, we passed one group of ten or twelve youngsters, in various costumes, going from door to door and singing lustily, if in somewhat different keys, a song with which we were not familiar, but which certainly glorified America and living therein. Those kids had something. They were happy and having a good time, and they spontaneously burst into song in praise of the land in which they were living.

The minds of children are pretty acute and apparently they had figured out that it is a very nice place to live, where one's parents have money to buy one entirely unnecessary costumes, and where neighbors as well as complete strangers, will pass out candy and apples and peanuts and all manner of things, just because it is a holiday.

Grown-ups may well take a lesson from their reasoning. There is more fear and apprehension in this country today than when our forefathers existed in daily and imminent danger of losing their scalps, and most of the fear is groundless.

As long as we have thousands and thousands of square miles of fertile farm land, and vast forests, and the greatest stock of metals in the world, and coal, and water-power, and countless other natural resources, as well as the greatest industrial development in the history of the world, we are not going broke, no matter what changes may occur in our economic set-up.

It is probably true that for years to come we will be forced to pay a share of what we produce for military purposes and to make sure that we keep our shores inviolate, but it will only be a portion, and there will be plenty for all in the untouched part. Our resources are so vast that, handled intelligently, they will

provide everything necessary for an entirely successful defense and it is entirely within the realm of possibility that the portion remaining for the individual may be greater than ever before. We have never at any time utilized our assets to the limit. That presupposes both great and unselfish wisdom in high places, and it also presupposes that grown men will not act the part of cravens and that we will not continually throw monkey wrenches into the gears either through fear or selfishness. It is a large order but it can be done. We have been a great nation in the past, and we have the opportunity of becoming a much greater one, if we care to embrace it.

At any rate, we are not going broke, and we are not going to be invaded, so forget it. Even if you do have to pay some taxes, you will be so much better off than any one else in the world, outside of this country, that there will be no comparison.

This is the month of Thanksgiving and our advice is to go down on your knees and thank whatever God you worship that you were not born to be a galley slave in the middle ages, or tortured by Indians, or burnt at the stake for your religion; that you are not a Czech, a Pole, a Dutchman, or a Frenchman, virtual slaves to a conqueror; that you are not a German, Italian, or Jap, with your life dedicated to killing other human beings; that you are not a Chinaman, Greek, or Englishman, who may be blasted into eternity at any instant; but that you are an American living in a land of great plenty where little children may still enjoy themselves on a holiday, or any other day, for that matter.

W. W. McCord.

DAYTON CONVENTION COMMITTEE SENDS US A CHECK

We have just received a check for $600.00 from the Dayton Branch Convention Committee. We wish to thank the members of Dayton Branch for their gift. It will help increase our balance which has been lowered considerably after paying for the copies of the Proceedings.

Corrosion Resistance *of* Cadmium *and* Zinc Electrodeposits Under Marine Conditions

By A. MANKOWICH
Associate Chemical Engineer
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THE extensive literature relating to the merits of cadmium and zinc electrodeposits is indicative of the doubt that has existed in many quarters concerning the superiority of cadmium over zinc. One need refer only to the abstract on "Cadmium Vs. Zinc Plating" in the August, 1930, *Metals and Alloys* to appreciate the diversity of opinion prevailing at that time. However, investigation at the Bureau of Standards (Research Paper R.P. 867, February, 1936) established several significant facts. One was that, in industrial atmospheres, zinc deposits show a definite superiority over cadmium of the same thickness. Second, cadmium deposits are superior to zinc in salt spray tests. The latter conclusion has led to the now generally accepted belief that cadmium is superior to zinc as a protective coating under marine conditions. It is the purpose of this paper to present hitherto unpublished data on the corrosion-resistant value of cadmium and zinc electrodeposits under strictly marine conditions.

PREPARATION OF SAMPLES

(a) The base metal upon which cadmium and zinc deposits were applied was cold-rolled sheet steel (SAE 1010) with a white pickled finish. All samples were 4″ long by 2½″ wide x 1/16″ thick, with an active plating area of 20.75 square inches per specimen.

(b) A circular 10-liter glass battery jar served as the plating bath. Nine (9) liters of solution was used in plating the specimens. The plating cell was operated with two anodes and one cathode, with a 3″ electrode distance. The zinc anodes measured 6″ long by 2½″ wide x 1/16″ thick, and analyzed as follows:

Lead	0.06%
Iron	0.026
Cadmium	Trace
Zinc	Remainder

The cadmium anodes were 99.9% electrolytic cadmium cast in circular rods, with an area equal to that of the zinc anodes.

(c) The cleaning procedure prior to plating was as follows:

1. Dip in carbon tetrachloride.
2. Immersion clean in a boiling solution containing 4 ounces per gallon trisodium phosphate and 2 ounces per gallon sodium hydroxide.
3. Cold water rinse.
4. Scrub with whiting.
5. Cold water rinse.

(d) The solution for zinc plating was made up according to the following formula:

$Zn(CN)_2$	60	grams per liter
KCN (95%)	44	" " "
NaOH (95%)	30	" " "

The 0.0010" zinc coatings were deposited at 15 amperes per square foot and 72°F. The other thicknesses of zinc coatings were plated at 30 amperes per square foot and 104°F. All zinc deposits were smooth, adherent and lustrous. Preliminary tests revealed that cathodic current efficiencies were as follows:

Amps. Per Sq. Ft.	*Temp.—°F*	*Current Efficiency*
15	72°	95.0%
30	104°	96.5%

(e) The cadmium plating solution was of the following composition:

$Cd(OH)_2$	26	grams per liter
NaCN (97%)	70	" " "
NaOH (95%)	15	" " "
Unsweetened condensed milk	2.8	" " "

All coatings were deposited at 30 amperes per square foot and 104°F, with a cathodic current efficiency of 93.0%. Deposits were bright, silvery-white. Deposition of these coatings as well as that of the zinc platings was at an elevated temperature only because of the ease with which satisfactory deposits could be obtained in the Laboratory.

(f) The various thicknesses of deposits were obtained by plating the specimens for a predetermined time, weighing the specimens before and after plating. Preliminary current efficiency measurements indicated the proper plating time for each thickness; and calculations involving the density of the deposited

metal, the active plating area of the specimen and the weight of the deposit resulted in values for average thickness of coating per specimen.

METHOD OF TEST

In this investigation, the corrosion-resistant properties of zinc and cadmium coatings were evaluated by change in weight measurements of specimens continuously immersed in 3% sodium chloride solution. The method of test closely simulated contemplated service conditions. After immersion in the corroding solution, the specimens were removed at intervals for determination of change in weight. Prior to weighing, the specimens were scrubbed under water with the hands, rinsed in alcohol and air dried. Agreement between duplicate samples subjected to this procedure was very good. Following each weighing, specimens were rinsed in alcohol and air dried before further immersion in the corroding liquid.

RESULTS

(a) Visual Observations

At the end of 24 hours immersion in 3% NaCl solution, 0.00013″ zinc and cadmium plated specimens contained a few small pinholes. Zinc plated specimens of all thicknesses, from 0.00013″ to 0.0010″, were discolored, with a dark gray and mottled appearance. All cadmium plated specimens, 0.00013″ to 0.0010″, retained their original bright, silvery appearance. The corroding solutions used with the zinc specimens had become turbid with white salts (basic zinc). The solution used with the cadmium plated specimens remained clear.

At the end of 48 hours immersion in the test solutions, pinholes had developed in the 0.00025″ and 0.00051″ cadmium coatings. All cadmium-plated specimens retained their initial brightness. All zinc-plated specimens had become more unsightly in appearance, with only the 0.00078″ and 0.0010″ specimens not showing appreciable base metal. The 0.00013″, 0.00025″ and 0.00051″ cadmium samples showed base metal at numerous pinholes where they had undergone attack.

At the end of 72 hours, conditions were similar to those at 48 hours with the exception that the 0.00083″ cadmium specimen had developed appreciable pinhole attack.

After 167 hours, all zinc specimens had large attacked areas showing base metal. All cadmium specimens except those with

0.0010″ deposit had appreciable areas showing pinhole attack; the 0.0010″ cadmium samples showed slight pinhole attack. All cadmium samples still retained their initial bright appearance in the unattacked areas.

After 233 hours, all cadmium-plated specimens had lost their bright finish and had assumed a dull, matte appearance. After the usual hand scrubbing under water, and drying, these samples were seen to have developed a hard oxide coating. All zinc specimens were very unsightly. The 0.0010″ cadmium specimens still showed only slight pinhole attack. At this time, although all samples with the exception of those with 0.0010″ cadmium coatings showed evidence of having undergone severe corrosive attack, no iron rust was perceptible in any of the samples tested.

(b) Tabulated Results

TABLE I—Change in Weight, Continuous Immersion in 3% NaCl

Thickness	*Plate*	*No. of Samples*	*Time Hours*	*Weight Change—Milligrams/Sq. In.*
0.0010″	Cadmium	3	46	0.62 lost
"	"	3	68	0.82 "
"	"	3	167	1.30 "
"	"	3	233	1.16 gained
"	"	3	336	2.23 "
0.0010″	Zinc	4	46	0.20 "
"	"	4	68	0.29 "
"	"	4	167	1.27 lost
"	"	4	233	2.42 "
"	"	4	336	4.12 "
0.00013″	Cadmium	2	70	0.77 "
"	"	2	167	1.16 "
"	"	2	233	1.02 gained
"	"	2	353	0.43 "
0.00013″	Zinc	2	70	0.47 lost
"	"	2	167	1.94 "
"	"	2	233	3.28 "
"	"	2	353	5.25 "

TABLE II—Change in Weight, Continuous Immersion in 3% NaCl

Thickness	*Plate*	*No. of Samples*	*Time Hours*	*Weight Change—Milligrams/Sq. In.*
0.00025″	Cadmium	2	353	2.76 gained
0.00051″	"	2	353	2.50 "
0.00083″	"	1	353	1.61 "
0.00027″	Zinc	2	353	3.96 lost
0.00051″	"	2	353	4.60 "
0.00078″	"	1	353	4.13 "

DISCUSSION OF RESULTS AND CONCLUSIONS

In order for a metallic coating to provide electrochemical protection for steel base metal, it must be anodic to the steel; that is, the electrodeposit must be the anode of the couple, electrodeposit-

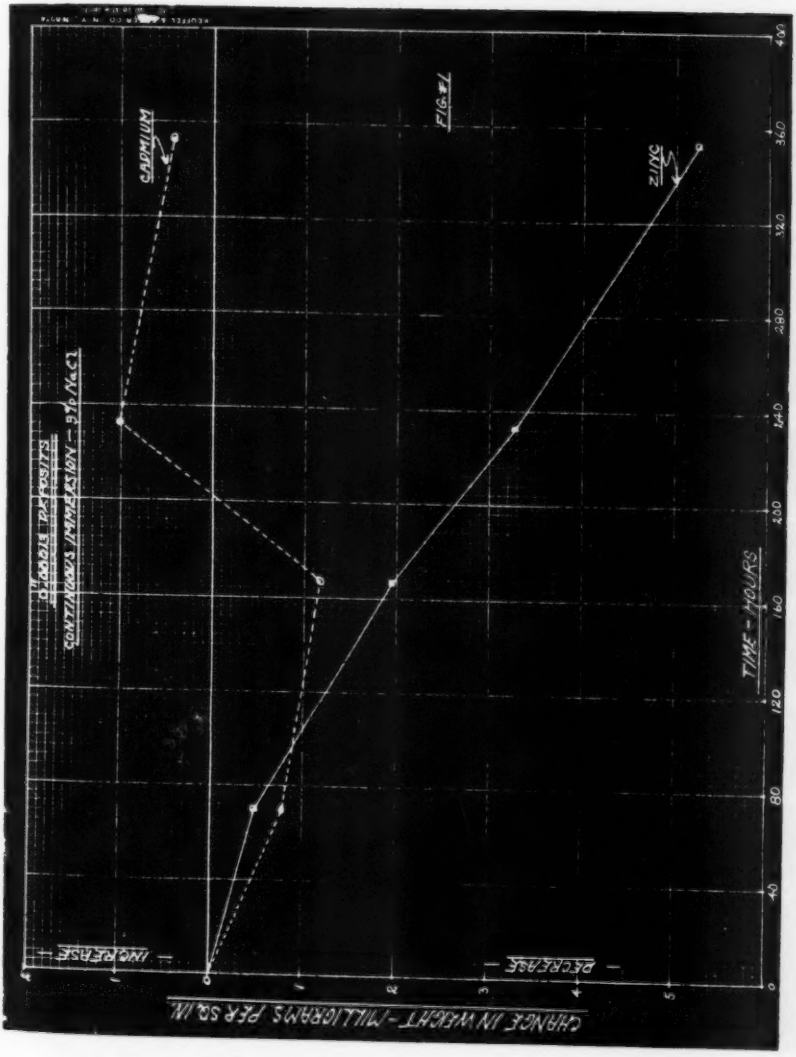


FIG. 1.
CADMIUM
ZINC
CHANGE IN WEIGHT - MILLIGRAMS PER SQ. IN.
INCREASE
DECREASE
TIME - HOURS
0
40
80
120
160
200
240
280
320
360
400
1
2
3
4
5

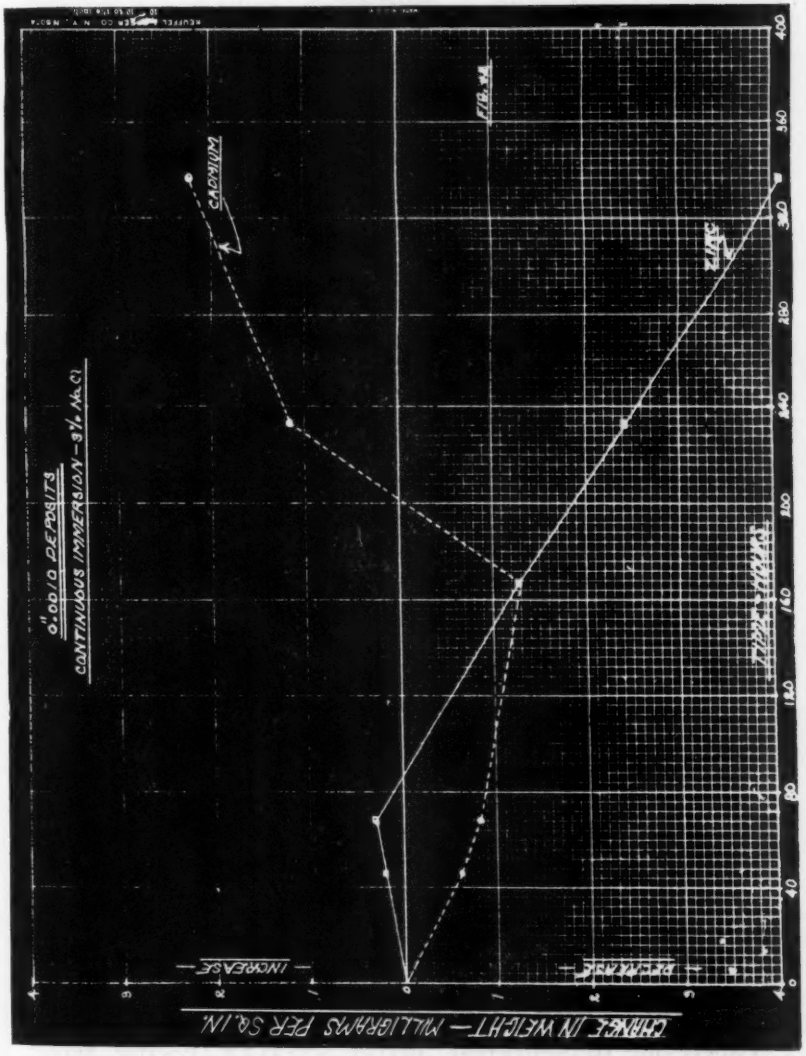
exposed steel in the corrosive medium prevailing under service conditions. While this is an important requirement for electrochemical protection, it is not the only factor upon which the corrosion resistance of the plated coating depends. If the galvanic potential set up by the couple is of appreciable magnitude (due to the high solution pressure of the coating), then anodic corrosion of the coating is excessive. As a result, the life of the deposit is limited, and its corrosion resistance is affected adversely. Other important factors are, first, the nature of the film or corrosion product formed on the surface of the coating in the corrosive medium and, second, the chemical activity (as distinct from electrochemical) of the coating in the corrosive medium.

Examination of the corrosion data reported here in the light of the aforementioned principles leads to the following conclusions:

(a) Cadmium deposits on steel are superior to zinc under severe marine exposure. The change in weight data indicates that zinc deposits on steel are subject to excessive anodic corrosion throughout the life of the coating. Cadmium deposits, after undergoing approximately the same amount of loss in weight for a short time (160 hours continuous immersion in 3% NaCl), begin to gain weight due to the formation of a film that resists marine attack. This tends to confirm the lower chemical activity of cadmium and its lower solution pressure. The fact that no rust forms on cadmium plated steel after appearance of exposed steel indicates, however, that cadmium remains anodic to steel throughout the length of the exposure.

(b) For mild conditions of marine exposure, and discounting the unsightly appearance of zinc plated steel under marine conditions, zinc and cadmium coatings provide equivalent protection to steel.

(c) Examination of figures 1 and 2 shows that the change in weight curves for 0.00013″ and 0.0010″ cadmium-plated steel are practically identical. Since the curves of figures 1 and 2 also indicate the superiority of cadmium over equivalent thicknesses of zinc in marine exposure, it follows that under conditions of marine exposure a substantially thinner deposit of cadmium will provide the same protection as a heavier zinc-coated steel. In this investigation, 0.00013″ cadmium was superior to 0.0010″ zinc.


CHANGE IN WEIGHT — MILLIGRAMS PER SQ. IN.
INCREASE
DECREASE
CADMIUM
ZINC
0·001 D.E. DEPOSITS
CONTINUOUS IMMERSION — 3% NaCl

"Information Please"

Answer these questions and qualify as an expert on Boston, one of America's great cities.

What is the area of Metropolitan Boston? .	1022.6 square miles
Its population?	2,385,465
How many universities, colleges, schools, are there in the metropolitan area? . . .	More than 200
When was Boston settled?	1630
Boston has how many churches? . . .	Nearly 1,000
How many daily and weekly newspapers? .	Over 175

What is the shopping, commercial, industrial, transportation, population center of New England?

What city is world famous for fine sea food?

In America what city leads in high-grade coffees?

Where was the birthplace of rubber vulcanizing and of the copper industry in America?

Where was the birthplace of the electroplating industry in America?

What major Atlantic Coast airport is most convenient to its downtown business district?

What city is known as The Hub of the Universe?

THE ANSWERS ARE

Boston

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29th ANNUAL NATIONAL CONVENTION
JUNE 9-10-11-12, 1941

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CONVENTION HEADQUARTERS—HOTEL STATLER—BOSTON, MASS.

The Story of Abrasives

By S. F. WALTON
Technical Director
The Exolon Company

MAN has used some form of abrading minerals since his beginning. First he fashioned the crude stone implements of the Stone Age with other hard stones. As he grew in stature he made crude metal implements of early history, working the edges sharp with an abrading stone. Later he hammered, ground, sharpened and polished the swords and battle axes of the Crusaders and polished the armor of the knights of old, using even harder abrading stones; then he ground and polished the implements of peace and war in our father's generation, still using the crude abrading stones which his forefathers had used. There are few of us who cannot remember the grindstone out by the woodshed, or the scouring board in the kitchen.

In the last two generations science has come into the picture of abrasives and abrading minerals. Science has classified the minerals according to hardness. Moh's hardness scale, worked out in the latter part of the last century, is still used. Moh selected ten common minerals which had different resistance to abrasion, giving each a number. Moh's original scale is given in the table below:

1. Talc, laminated
2. Gypsum, crystallized
3. Calcite, transparent
4. Flourite, crystalline
5. Apatite, transparent
6. Orthoclase, white cleavable
7. Quartz, transparent
8. Topaz, transparent
9. Sapphire, cleavable
10. Diamond

These numbers have no quantitative relation—there is no common difference. The diamond differs much more from sapphire than sapphire does from talc.

In present day testing, the method is more exact than was Moh's hand method. The mineral to be tested is moved on a

little carriage under a fixed cutting point and the pressure which is necessary to produce a visible scratch is determined.

Another method is boring with a diamond splinter under constant pressure and comparing the loss in weight for a given penetration or given number of movements.

Accepted intermediate values are Window Glass 5.5, Jewelers' File 6.5, Zircon 7.5, Chrysoberyl 8.5, Silicon Carbide 9.5.

Using this table, science has considered minerals harder than the Jewelers' File 6.5 as abrasives. These natural minerals are in the order of increasing hardness as follows:

Quartz—Quartz in its many forms has a hardness of 7.

Garnet—Garnet varies in hardness from 6.5 to 7.5. The common garnet, mostly almandite and andradite, approaches 7.5 and is the type used as an abrasive. Generally considered harder than quartz.

Emery—Emery is a mixture of corundum, magnetite, hematite, quartz and spinel. Its hardness varies from 7 to 9 depending on the quantity of corundum present.

Corundum—Corundum has a hardness of 9. Natural corundum is in massive crystal formation but chemically is the same as the sapphire.

Diamond—Diamond has a hardness of 10. It is the hardest known natural substance. It will cut or scratch all other known minerals.

In the latter part of the last century science seemed to pay particular attention to synthesizing minerals and it was from this experimental work that the present day synthetic or artificial abrasives produced by the electric furnace were born. In the first year of this century Charles F. Jacobs made electrically fused aluminum oxide from calcined bauxite. It had the required hardness and toughness but was contaminated with metals produced in the process. Charles H. Hall, who worked out the process for producing aluminum metal, found that by addition of iron the metallic impurities either settled in a button at the bottom of the furnace or were made sufficiently magnetic to enable them to be readily removed magnetically. The combination of Jacobs and Hall processes, with only slight modifications, is the process used today in the production of regular fused aluminum oxide—artificial corundum. Special varieties,

such as white aluminum oxide, are produced from special raw materials by several processes. These white aluminum oxide products are almost entirely free of the oxides of iron, silicon and titanium.

In the last decade of the 19th century E. G. Acheson discovered, by accident, silicon carbide which he called carborundum. Silicon carbide is the only true artificial common abrasive since it is not found in nature. Since the discovery of silicon carbide other metal carbides and metalloids have been produced by various scientists and workers in the abrasive field, but they are of little importance in the abrasive industry.

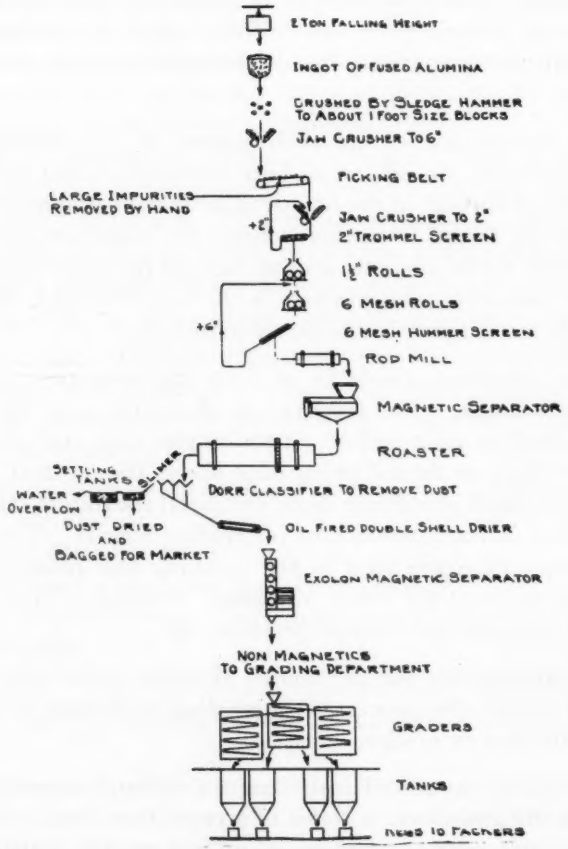
Abrasive materials would be of little use were they not put into suitable form. The preparation of abrasives in the grain form required by each industry necessitates care and precision. The Flow Sheet on the following page shows the method of producing from fused aluminum oxide (artificial corundum) the type of grain used in the manufacture of grinding wheels. Variations of this preparation are used in the crushing and production of abrasive grain used for other purposes. A similar Flow Sheet is used for natural abrasives in common use.

In the present day preparation of abrasive grain, one of the important steps in the process is the grading or dividing the crush into various sizes or grades.

Separating the run-of-mill into sizes, or grading, is accomplished by passing the grain over a series of screens from fine to coarse. The size passing over the fine sieve and not passing through the next sieve coarser is the grit size wanted. In this manner the finest grade is removed first and then successively coarser and coarser grades. In modern grading, the screening is accomplished by passing the material over the coarse screen first, catching the through material in a pan and delivering this material to the next screen finer and so on to successively finer and finer screens.

The material passing the coarser screen above and retained on the screen next finer is the wanted size.

In the early days the screens selected were the even number screens and produced in emery and other natural abrasives the sizes 4, 6, 8, 10, 12, 14, 16, 20, 22, 24, 30, 36, 40, 50, 54, 60, 70,

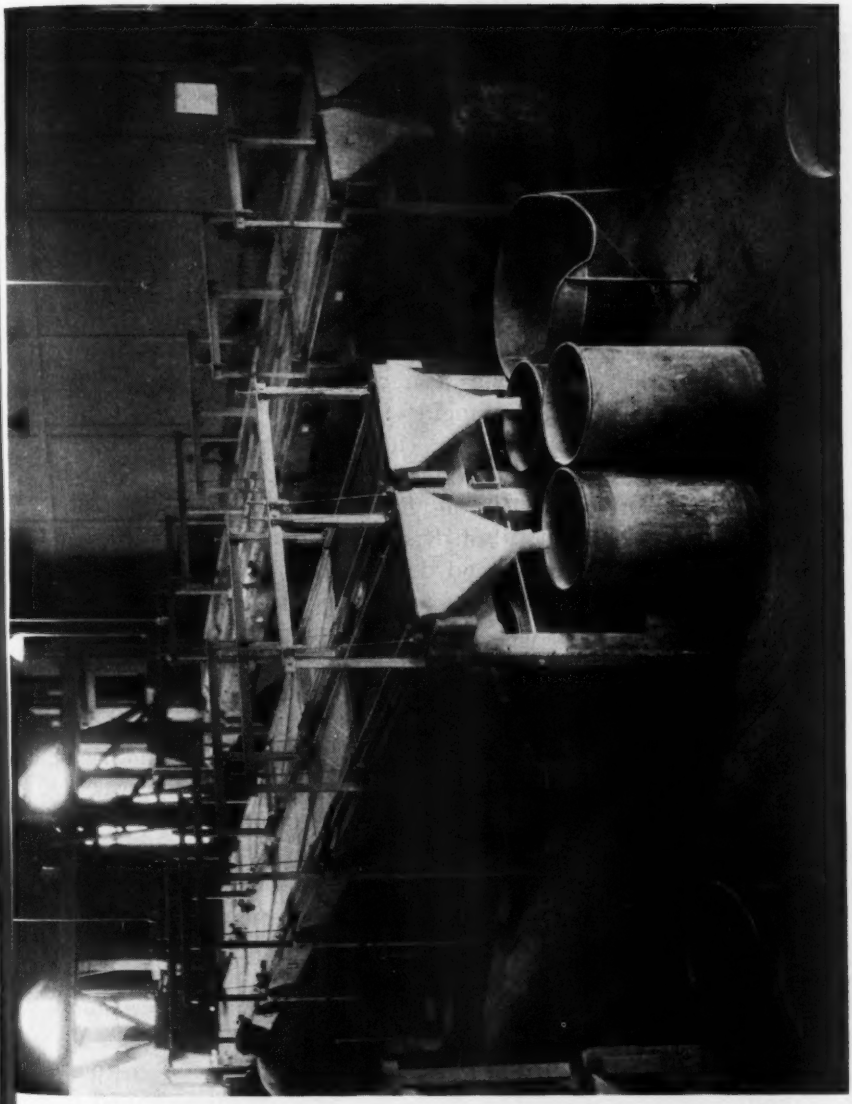


Flow-Sheet of Fused Aluminum Oxide Cleaning and Preparation Plant.

80, 90, 100, 120, 130, 140, 150, 160, 180, 200, 210, 220 and 275. The sizes 130, 150 and 210 were close intermediate sizes. At that time there were no sizes finer than 220, no unclassified flour sizes nor classified flour sizes.

In modern abrasive production the grades or sizes are numbers 6, 8, 10, 12, 14, 16, 20, 24, 30, 36, 40, 46, 54, 60, 70, 80, 90, 100, 120, 150, 180, 220, 240, 280, 320, 400, 500, 600 and unclassified flours F, 2F and 3F—31 grit sizes or grade numbers in all.

In the early days no effort was made to control these sizes, nor were there any set standards.



STANDARD GRADING—Splitter in rear, overhead, delivers rough grades or splits to head of each line of graders, which divides each split into five grades, a fine tail and an oversize. The oversize is delivered to the head of next line coarser, while the undersize or fine tail is delivered to the head of next line finer. Oversize may be returned to crushing unit for further reduction.

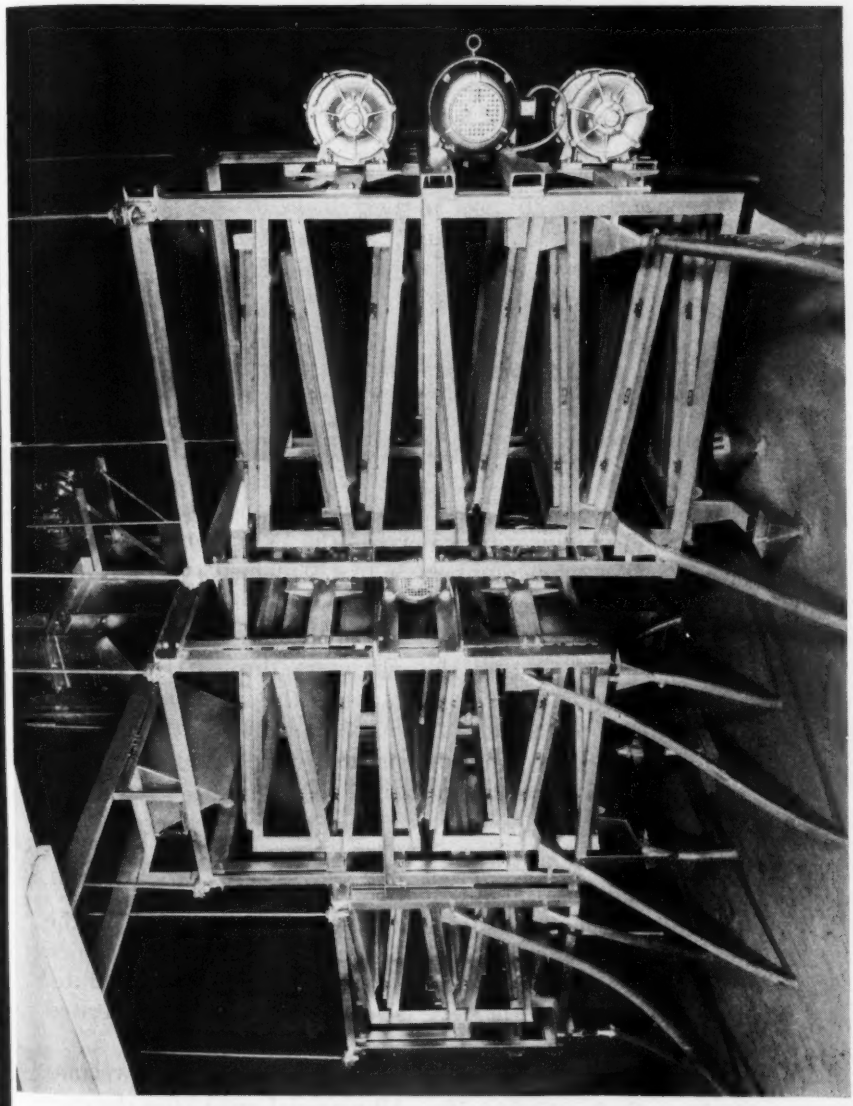
Later a sort of standard was maintained, particularly after fused aluminum oxide or artificial corundum became more popular. The test used was as follows: Hand screens were made of the wire screens and grit gauzes used in producing the sizes. One screen coarser than the screen through which the size was made was used as the control. All grit had to pass this screen. The fine screen selected was two screens finer than the screen on which the grit was retained when made. If this screen just barely passed any particles, the size was considered satisfactory. If any particles passed readily, the material was considered unsatisfactory. No specified amount was tested. Whatever was drawn from the tank or dipped from the container was the sample used.

In 1910 the W. S. Tyler Co. developed a standard Screen Scale with a 1.414 ratio ranging from .0029 inch opening (200 mesh) to 1.05 inch opening. A closer sizing was developed later using the fourth root of 2 or 1.189, the factor recommended by Prof. Richards. In 1919 the Bureau of Standards proposed using the same ratio as Prof. Richards but using 1 mm opening as a base and increasing and decreasing the opening from this base. In this series the sieve number is the nearest number to the meshes per linear inch. The sieve number 200 in this series has the same opening .0029 inch as in the Tyler series.

Using the Bureau of Standard Series of Sieves, the Abrasive Grain Industry set up in 1931 a "Table of Allowable Limits for the Sizing of Aluminum Oxide and Silicon Carbide for Polishing Uses and Grinding Wheel Manufacture." This table was the result of the work of representatives of the producers of abrasives and the users of abrasives meeting in several committees over the years from June, 1919, when the first committee met to study and report on the subject of standardization of grain sizes, until May 8, 1930, when the table of allowable limits was approved and adopted at a general conference in Washington, D.C. This table was published in *Simplified Practice Recommendation R 118-30*, a Bulletin of the U. S. Dept. of Commerce.

Some other tables more or less stringent were submitted to the producers of abrasive grain by users. One which was used for some time for polishing grain only was the GMC Standard submitted to producers in the spring of 1930.

In 1936 the Technical Committee of the Abrasive Grain Association modified the table of allowable limits. The table as now issued is shown on Page 848.



MODERN GRADING—Splitter and Grader combined. Grades are spouted to hanger tanks on floor below. No manual manipulation is required. Twenty-one screens produce nineteen grades.

Table of allowable limits for the sizing of aluminum oxide and silicon carbide abrasives for polishing uses and grinding wheel manufacture

Grit No.	Sieve through which 100% must pass	Control sieve No.	Control sieve Opening	Maximum of oversize on control sieve	Minimum through control sieve and retained %	On sieve No.	Cumulative minimum through control sieve and retained %	On sieve No.	Maximum of 3% through sieve No.
			Inch	%					
10	7	8	0.0937	15	45	10	80	10 & 12	14
12	8	10	.0787	15	45	12	80	12 & 14	16
14	10	12	.0661	15	45	14	80	14 & 16	18
16	12	14	.0555	15	45	16	80	16 & 18	20
20	14	16	.0469	15	45	18	80	18 & 20	25
24	16	20	.0331	20	45	25	75	25 & 30	35
30	18	25	.0280	20	45	30	75	30 & 35	40
36	20	30	.0232	20	45	35	75	35 & 40	45
40	25	35	.0197	20	45	40	75	40 & 45	50
46	30	40	.0165	20	45	45	75	45 & 50	60
54	35	45	0.138	20	45	50	75	50 & 60	70
60	40	50	.0117	30	45	60	65	60 & 70	80
70	50	60	.0098	15	45	70	70	70 & 80	100
80	60	70	.0083	15	40	80	70	80 & 100	120
90	70	80	.0070	15	40	100	70	100 & 120	140
100	80	100	.0059	15	40	120	65	120 & 140	200
120	100	120	.0049	15	30	140	60	140 & 170	230
150	100	140	.0041	15	40	170 & 200	75	170, 200 & 230	270
180	120	170	.0035	15	40	200 & 230	65	200, 230 & 270	—
220	140	200	.0029	15	40	230 & 270	60	230, 270 & 325	—

For a special polishing grain, particularly the surface-treated grain, a second modification known as the POL. Series has been put into effect for grade numbers 36 to 220 inclusive. The maximum of oversize on the control sieve is five less than the maximum of oversize on the control sieve of the standards for grades 36, 40, 46, 54 and 60, and the maximum through the control sieve and retained on is 15% greater than the table above for all grades 36 to 220 inclusive. The maximum of 3% through the sieve number is reduced to a maximum of 1% through the sieve number on grades 36 to 220 inclusive.

The sieves referred to in the above table are those of the United States Standard Sieve Series certified by the National Bureau of Standards, or equivalent.

The allowable limits set forth in the table are based on the shaking of a 100-gram sample for 5 minutes on a Rotap machine operated at a speed of 290 r.p.m. and 156 taps per minute. Where more than a single sieve is used, they are to be agitated simultaneously.

The following is an example of the use of the preceding recommendation: Take grit No. 10. All material must pass through the coarsest sieve (in this case the No. 7). Through the next to coarsest sieve, termed the "control sieve" (in this case the No. 8) all material may pass, but not more than 15 percent may be re-

tained on it. At least 45 percent must pass through No. 8 (the control sieve) and be retained on No. 10 sieve, but it is permissible to have 100 percent pass through No. 8 (the control sieve) and remain on No. 10 sieve, the requirement being that the grain passing through No. 8 (the control sieve) and retained on No. 10 and No. 12 must add up to at least 80 percent. Consequently, if 45 percent passed through No. 8 sieve (the control) and was retained on No. 10 sieve, then at least 35 percent must be retained on the No. 12 sieve. There are no requirements for material retained on the finest sieve (in this case No. 14 sieve) but not more than 3 percent is permitted to pass through the No. 14 sieve.

UNITED STATES STANDARD SIEVE SERIES

(Requirements for sieve openings and wire diameters with permissible variations)

Designation	Corresponding United States Standard Sieve Series	Sieve opening		Wire diameter		Tolerance in average opening	Tolerance on wire diameter		Tolerance in maximum opening
							Under	Over	
1	2	3	4	5	6	7	8	9	10
Microns	*No.*	mm	*Inch*	mm	*Inch*	%	%	%	%
4,760	4	4.76	0.187	1.27	0.050	±3	15	30	10
4,000	5	4.00	.157	1.12	.044	±3	15	30	10
3,360	6	3.36	.132	1.02	.040	±3	15	30	10
2,830	7	2.83	.111	.92	.036	±3	15	30	10
2,380	8	2.38	.0937	.84	.0331	±3	15	30	10
2,000	10	2.00	.0787	.76	.0299	±3	15	30	10
1,680	12	1.68	.0661	.69	.0272	±3	15	30	10
1,410	14	1.41	.0555	.61	.0240	±3	15	30	10
1,190	16	1.19	.0469	.54	.0213	±3	15	30	10
1,000	18	1.00	.0394	.48	.0189	±3	15	30	10
840	20	.84	.0331	.42	.0165	±5	15	30	25
710	25	.71	.0280	.37	.0146	±5	15	30	25
590	30	.59	.0232	.33	.0130	±5	15	30	25
500	35	.50	.0197	.29	.0114	±5	15	30	25
420	40	.42	.0165	.25	.0098	±5	15	30	25
350	45	.35	.0138	.22	.0087	±5	15	30	25
297	50	.297	.0117	.188	.0074	±6	15	35	40
250	60	.250	.0098	.162	.0064	±6	15	35	40
210	70	.210	.0083	.140	.0055	±6	15	35	40
177	80	.177	.0070	.119	.0047	±6	15	35	40
149	100	.149	.0059	.102	.0040	±6	15	35	40
125	120	.125	.0049	.086	.0034	±6	15	35	40
105	140	.105	.0041	.074	.0029	±8	15	35	60
88	170	.088	.0035	.063	.0025	±8	15	35	60
74	200	.074	.0029	.053	.0021	±8	15	35	60
62	230	.062	.0024	.046	.0018	±8	15	35	90
53	270	.053	.0021	.041	.0016	±8	15	35	90
44	325	.044	.0017	.036	.0014	±8	15	35	90

The above tables are from *Simplified Practice Recommendation R 118-36*, effective date, September 1, 1936.

These are the sieves used by the abrasive industry. However, it is not sufficient to use a set of U. S. Standard Series Sieves but

the set to be used must be calibrated with standard samples which have been checked against the master set of sieves adopted and in possession of the Technical Committee of the Abrasive Grain Association. In this manner the Abrasive Industry today maintains a uniformity of sizing not possible until these standards were adopted.

In making the standard tests for sizing, a 100 gram sample is carefully selected, usually by a thief sampler. The sample is placed on the top sieve of the required nest and the Rotap machine run for the stipulated number of minutes—5 minutes is standard procedure. For quick tests some laboratories use 50 grams tested 3 minutes.

In addition to testing for sizing, the abrasive manufacturer tests for apparent density or weight per cubic foot, capillarity or wettability, cleanliness and magnetic material. Freedom from magnetic material is particularly essential in the polishing of stainless steels.

For the polishing of metal, in addition to special grading or sizing, the industry has developed special surface treatments for artificial corundum or fused aluminum oxide which either create a nodular surface or etch the surface, or both. A greater adhesion of the glue to the surface of the grain is obtained by these treatments.

In using cements which have come to the fore in late years this surface treatment of the abrasive does not appear as essential as when glue is used.

Set-up wheels for flexible grinding are usually set up with animal glue. The wrong use of glue or the mishandling of glue in the preparation of the wheels, or the use of the wrong wheel for the job, can cause a loss of grain and make even the best abrasive grain appear inefficient.

In the use of cements the manufacturer's instructions should be followed explicitly.

In flexible grinding, artificial corundum or fused aluminum oxide properly prepared and selected in the proper sizes, set up on the right wheels with a first class adhesive, will be more efficient and less costly than natural abrasives such as emery.

Where color or burnishing before buffing is required, natural abrasives such as emery will give a better surface due to its different action.

In the preparation of metals for surface finishing, there are a number of steps required. A hard wheel or grinding wheel may be required to remove excess metal, particularly from castings, riveted fabricated pieces, etc. After the hard wheel, a flexible grinding wheel is used, followed by polishing (using grease or oil), the final step being buffing. Each step removes the marks created by the previous step. A variety of finishes may be had by varying the procedure and the abrasives used.

In the table below is listed the procedures commonly used in the preparation of various metals.

TABLE OF GRAIN SELECTION

(Aluminum Oxide unless otherwise specified)

	Polishing Operation				
PARTS	*First*	*Second*	*Third*	*Fourth*	*Fifth*
Axes	46-60	70-90	120	150-180*	—
Aluminum, sand-cast (Inside-bottom)	36-46	—	—	—	—
Aluminum, sand-cast (Outside)	60-80	120-180	Buff	—	—
Aluminum, die-cast	150*	Buff	—	—	—
Aluminum sheet	120*	180*	Buff	—	—
Auto bumpers	60-90	120	150-180*	—	220*
Auto headlights	180-220*	Buff	—	—	—
Automobile fenders and sheet stock for enameling	90	120-150	—	—	—
Automotive hardware	36-54	90	120	220*	—
Band saw steel	60-80	120-150	—	—	—
Brass, sand-cast	60-80*	150-180*	220-3F*	—	—
Brass, sheet	180-220*	Buff	—	—	—
Cutlery	80	120	Pumice	Buff with compound	
Electric Irons	60-80	120*	150*	180-240*	—
Forks, hay	60-70	100-120	—	—	—
Forks, spade	24	—	—	—	—
Gray iron, pickled	80	120-150	—	—	—
Gray iron, not pickled	70	120-150	—	—	—
Hammer heads	46-60	100-120*	—	—	—
Hoes, first quality	36-46	70	100-120	—	—
Hoes, second quality	36-46	—	—	—	—
Knives, table and steel blades	80-90	120-150*	220F	Buff (Special machines)	—
Knives, table backs	46-60	—	—	—	—
Knives, machete, edges	46-60	—	—	—	—
face	80	120*	—	—	—
Locomotive side rods	36	60-70	120	—	—
Monel metal, deep-drawn	120	150	180*	Buff	—
Monel metal, cast	80	120	150	150*	Buff
Monel metal, full-finish sheet	180	180*	220*	Buff	—
Plows	24-36	80	120-150	180-220*	—
Plow shares	36-46	—	—	—	—
Plow discs	30-46	70-90	—	—	—
Shears, tinsmith	46	60	120-150	180	—
Shovels, blades	36-46	120	—	—	—
Shovels, straps	36-60	—	—	—	—
			120 (belt)		
Stainless steel:					
Mirror finish	60-80	100-120*	150*	220-3F*	Buff
Commercial finish	80	100*	120*	150*	—
Wrenches	30-46	80	120*	—	—

(*) Denotes grease or oil wheel.

(The above table is from *Grinding Wheels and Their Uses*, a Handbook and Textbook on Modern Grinding and Polishing Practice and Theory, by Johnson Heywood, under the auspices of The Grinding Wheel Manufacturers Association and The Abrasive Grain Association, published by The Penton Publishing Co.)

A MESSAGE FROM THE 1941 NATIONAL CONVENTION CHAIRMAN

For twenty-eight years the annual conventions of the American Electroplaters' Society have "sparked" progress in the art of plating and finishing of metals, with the result that modernization of solutions, equipment and methods is forging resolutely ahead, and electroplating is maintaining its position as one of the nation's leading industries. The momentum of this progress is all-important and can best be maintained through the industry's concerted support of these annual meetings.

The twenty-ninth Annual National Convention will be held at Boston, Massachusetts, the week of June 9 to 12, 1941, and again will bring together hundreds of platers, plant superintendents, factory executives, and shop foremen, for their yearly review of papers presented by some of the country's leading engineers.

Past experience has proved the tremendous influence which these gatherings exert toward improved operating conditions and methods, and their effect on the general welfare of the plating industry. The convention discussions bring out the best thought of the industry on methods and equipment for each particular phase of operation, and coupled with the formal program discussions is the informal exchange or "swapping of ideas."

This year the papers presented will place special emphasis on new developments of the electrodeposition of metals. The far-reaching value of such an array of speakers can hardly be overestimated. Through this medium, platers throughout our nation are privileged each year to learn at first hand just what is available for every operation in the plating room.

Convention week each year renders still another valuable service in bringing together the electroplaters of the United States and Canada. Their acquaintance and intimate association make for the close-knit industry personnel which is all-essential in the cooperative efforts required in meeting harassing economic and operating difficulties.

The 1941 National Convention promises to be the greatest convention ever held in the history of the A.E.S. Every plater, and all those interested in the electroplating field, should attend this annual meeting, and I sincerely hope that every executive and key man in our industry will be present. In conclusion let me say, "Plan now to attend the greatest convention ever held," and be sure to bring the ladies as we have a wonderful program planned for them. Will see you all in June.

JOE BARRON,
National Convention Chairman

Here and There

In the September REVIEW we told our readers of the possibility of reviving interest in the city of Indianapolis amongst the plating fraternity. Well, we have gone a step farther; the branch is now a reality. Before going into the details, however, let us tell you the whole story.

In order to attend the Lancaster meeting on Friday, October 11, we arose from our slumbers earlier than usual to catch the train for our destination, the section of the country where the Amish people dwell, Lancaster County, Pennsylvania. There we were met by our good friend, LeRoy Critchfield, president of the Branch. Preceding the meeting, a supper was held at which about thirty were present. The speaker at the meeting was Mr. Gus Munning, who does not ordinarily act in this capacity but who kindly consented to be a pinch hitter for the scheduled speaker. "Polishing Wheels" was the subject, and every phase was well covered during the address and the discussion that followed.

Knowing in advance that we were headed for the Hoosier State and realizing that our oldest girl lives in Uniontown, Pennsylvania, where we expected to spend the Sabbath, Mr. Critchfield suggested that we drive over the new "dream highway." This beautiful six-lane road which has just been finished is one hundred and eighty miles long, stretching between Harrisburg and Pittsburgh. You pass through seven tunnels, under the mountains, built of cement and nicely lighted. The scenery along the countryside was beautiful. The toll charge amounts to approximately $1.50 per car, one way.

Leaving Pittsburgh on Monday morning, we arrived in Indianapolis late that night. Made several calls on Tuesday and Wednesday with Mr. Binai, who made complete arrangements for the supper and meeting place at the Hotel Riley on Wednesday the sixteenth. Covers were laid for fifty but two more seats had to be borrowed as a couple of extra guests arrived, one being the president of Anderson Branch, Mr. Charles Hauri, foreman at the Delco Remy plant in Anderson.

The first meeting at Indianapolis: Following the supper, Mr. Binai introduced the Executive Secretary, who spoke at some length on the A.E.S., its meaning, its benefits, and its educational advantages. Thirty-five members of those present signed the application blanks. (Some signed previous to the meeting.) Their names will take the regular course so that in due time they will be listed as regular members of the Indianapolis Branch.

The following were elected temporary officers: President—Walter Binai; Vice-President—Richard Hennessey (Mr. Hennessey was president of the original branch which disbanded in 1910.); Secretary-Treasurer—Leland Bass; Librarian—David Ross; Chairman of Membership Committee—Earl Esner; Board of Managers—E. H. McCown, Donald Patrick, A. L. Crease.

After the election of officers, we had the honor of presenting the temporary charter to Mr. Binai, the new president. Before adjournment we took note of the following: A beautiful bouquet of flowers graced the center of the table where the meal was served, the gift of Mr. Binai. . . . A telegram from Robert Wagner of Anderson Branch was read, extending congratulations to the new branch officers and members. . . . The large number of young men, some of whom willingly accepted the responsibilities of the branch offices. . . . The diversity of plants represented and the enthusiasm manifested on all sides at the success of the meeting.

Good luck, boys, all the other members of the A.E.S. wish you well as you start to make Indianapolis Branch one of the best in our organization's history.

DAYTON AND SIDNEY

On our way home on Thursday, we stopped at Dayton in quest of advertising and being so near the Stolle plant in Sidney, Ohio, we visited our third vice-president, Charles C. Conley, whom we had not seen since the convention. We couldn't help noticing what a busy man Charlie is and what nice work they do on refrigerator parts, aluminum particularly. Plating, lacquering

and enameling is also done in great quantities,—all of which keeps our vice-president on the jump, but nevertheless, as good natured as ever.

ROCHESTER BRANCH

Our next stop on the way home was Rochester, New York, where we promised to attend their meeting on Friday night, October 18. In spite of the rain which kept the attendance down, we had a most enthusiastic meeting at the Hotel Seneca, presided over by Sylvester P. Gartland. After telling the boys here of the various items of activity in the different branches, we asked for questions and we got plenty of them. Nearly everyone present joined in the discussions, one of which was the preprinting of convention papers.

The Rochester members are not wholly sold on the idea of spending four hundred dollars per year on these preprints. We might say that other branches hold a similar view. The objections seem to be the evident disregard of the expense involved on the part of many who receive their copies and carelessly throw them aside or leave them on hotel tables to be picked up by others not connected with the A.E.S. Then there may be the tendency to neglect the educational sessions, inasmuch as the information desired is chronicled in the preprints. The opinion was also expressed that as long as the convention proceedings were given to each member, that should suffice, without further duplication of effort in furnishing preprints.

An earnest discussion regarding the training of young men in the fundamentals of plating was discussed at length. It was finally decided that classes be held each week to this end, inviting members and non-members alike, so that anyone interested in plating would get a knowledge of the art, which seems to be the need today. We invite our readers to study the program adopted by New Haven and Rochester Branches (in this issue) which shows the trend of thought in the minds of the members and which will no doubt be adopted by some of the other branches.

Another long debate was started by Mr. Del Rosso concerning the patenting of ideas presented by our members, rather than have them taken over by outsiders and licensed by them for profit. We are counting on Judson Elster, the secretary and Phil LoPresti, the librarian, to keep us informed regarding the success of the classes.

MONDAY OCTOBER 21 AT HARTFORD

Kenneth Bellinger asked us to spend the day previous to the meeting at the Underwood Elliott Fisher plant, and in visiting several of the large plants in Hartford and New Britain.

Our first stop was at Colts, where we were courteously received. It was a real privilege, in making this visit, to renew acquaintances with George Vibberts, the foreman in the plating department. We hadn't seen each other for years. George was our first instructor in the art of plating, when he was in charge of the Smith & Wesson plant in Springfield. We were glad to see him looking so well. It was a pleasure also to meet his boy who is following in his dad's footsteps in the plating business, and is also at Colts. We made many calls, had the pleasure of greeting our old friend Ed Christ, Stanley Chemical Works at East Berlin. Here is a splendidly equipped plant for the manufacture of lacquers. It is worth a visit any time just to see the way things are controlled.

Towards evening we were invited to the Bellinger home for dinner, had the pleasure of meeting Mrs. Bellinger, then on to the meeting. In last month's REVIEW we gave you an outline which was written previous to the meeting. Here are a few additional items: There were 148 persons in attendance. . . . Nearly all the industrial plants in this section were represented. . . . First Vice-President Candee spoke briefly on the drive for new members. . . . Mr. G. W. Spahr, manager of the General Research Laboratory was present and received a vote of thanks for his fine cooperation. . . . The Information Please program was something new but well worth while.

Thanks are due to the Hartford Branch officers, Messrs Backus, Kohrs, Austin and Bellinger, and also to John G. Poor of the Underwood Company's laboratory staff, for their part in making the meeting a success.

AMERICAN BUFF PROGRESS RAPID

Planned and efficient management has effected the rapid growth of the American Buff Corporation, during the past five years.

Constant vigilance over the making of buffs, the quality of the materials and workmanship, and studious development in the construction of American Buffs has achieved a prominent place for American Buff Corporation throughout the industries. The management believes that its success will come as the result of superior quality buffs.

Typical of American Buff Corporation's conscientious service is this recent incident. A long distance telephone order for buffs was received at 4:45 in the afternoon, fifteen minutes after the employees had left for the day.

The customer, however, urgently required these buffs for the following morning. He promised to telephone the following morning at 9 a. m. to ascertain the progress being made in filling this important order. He did call at 9 a. m., but astonishingly enough he was actually telephoning his expression of appreciation for having received the complete order of buffs ahead of schedule. This promptness of delivery helped the plant to an early start and probably eliminated the possibility of many wasted man hours.

WALTER R. BINAI
President of Indianapolis Branch

Dr. C. B. F. Young Meets Criticism

Mr. Mankowich and I disagree as to the requirement of students taking educational work in plating. My outline appearing in the September issue of the MONTHLY REVIEW was based on experience gained during the last five years in teaching men in this field. The majority of the men completing the course had not finished high school and many of them had only completed grammar school. Yet, by applying themselves, they have been able to go places in the industry. I always begin with the assumption that the student knows no chemistry. My courses have been built upon this idea and, as a result, a man with a grammar school education can improve himself tremendously. This has been proven by some two hundred and fifty men who have studied under me.

My opinion very definitely is that the plater has a dual function. The first is to attend to production and the second is to attend to the technical side of plating. I do not think that any man is worthy of the name "electroplater" unless he can perform these duties. May I point out that in the approximately fifty thousand plants throughout the United States doing plating there are relatively few which have a plant laboratory, let alone a technician. Therefore it is imperative that the plater be able to help himself. May I also point out that analysis of plating solution is not an electrochemical definition. This is pure chemistry. Again Mr. Mankowich writes, "I fail to see the necessity of a knowledge of the periodic law, fixation of nitrogen, phase rule, etc." The writer here is confused. Phase rule is mentioned in connection with a study of metallurgy and metallography. These courses are designed for those men wanting to continue their study in the field of metallurgy and has nothing to do with a course in plating. The courses are separate and distinct and it is not necessary for the platers to take metallurgy or metallography unless they want it.

We must keep in mind at all times that the important thing to remember in educational work is to give the student material which will aid him in turning out better electroplated work. It is up to the lecturer to make this as interesting as possible. May I point out here that Mr. Mankowich contradicts himself. To quote: "I have found that platers are disinterested at a lecture covering, for example, conductivity, current efficiency, and Faraday's laws. They feel that this information will not benefit them." Above this he states, "Specification plating of various metals should be covered." It is impossible to teach specification plating without going into Faraday's laws and current efficiency.

Plating education can be taken up from two points of view. Under one heading we can go into great detail to explain and

teach the student the mechanism of electroplating. By this I mean we can show the student how to rack up his work, how to dry the material in sawdust, how to carry the work through the process without scratching, etc. The other method consists of teaching the student what happens when he cleans an object, the method of rinsing the byproducts of cleaning, the method of transferring the ions of metals into metals at the cathode, and the theory behind drying. In short, the second method deals with the theory of practical plating. It is my personal opinion that the first method of education can and should take place in the shop under a foreman plater during working hours. The second method should be used at schools and Institutes where equipment is available for illustrating these laws.

My work has been dealing with the plater's helper, the plater, the plating foreman and the technical man. I have endeavored to help all these men. In summing up my work in the educational field, I might say that I have always stressed the point of making the man in plating a better man so that better work can be obtained. In doing this we are guarding against any inroads from competition. May I say that as long as we in the plating field continue to make advancements there is no need to worry about any kind of competition We can meet it.

C. B. F. YOUNG

PHILADELPHIA BRANCH MEETING AND BANQUET

The meeting and Banquet will be held on Saturday, November 23, 1940, at the Broadwood Hotel, corner Broad and Wood Streets, Philadelphia, Pa., Dr. Edward P. Sanigar, Chairman of the Educational Committee has arranged for the following papers and speakers:

The Why and Wherefore of Overvoltage and the importance in Electrodeposition, By Dr. Samuel Glasstone, Princeton University, author of *Electrochemistry of Solutions*, *Text book of Physical Chemistry*, *Etc.*

What Pure Metals can be Deposited from Aqueous Solutions, by Dr. Wm. Blum, Bureau of Standards, Washington, D.C.

Control in the Plating Room, by Mr. Charles C. Conley, The Stolle Corp., Sydney, Ohio, 3rd. Vice President of the A. E. S.

The Electroplaters' Part in the National Defense Program, by Mr. George B. Hogaboom of the Hanson-Van Winkle-Munning Co., Matawan, N. J.

Mr. George Long, Chairman, will see that Hotel and Entertainment arrangements are perfect. Mr. Ray Eckert, Chairman Ladies Souvenirs and Door prizes, will see that they are of the best and also providing refreshments. Mr. Warren Reynolds, Chairman of Programmes, will look after the advertising. Mr. George Gehling, 5001 Tulip St., Philadelphia, Pa., will provide all with tickets at $2.50 each.

Come one. Come all. And enjoy and profit by your attendance at the Philadelphia Yearly Functions.

GEORGE LONG, *Chairman of the Committee*

DETROIT BRANCH
AMERICAN ELECTROPLATERS' SOCIETY

◆

ANNUAL

EDUCATIONAL SESSION and BANQUET

Hotel Statler, Saturday, December 7, 1940

◆

Speakers

DR. C. F KETTERING, General Motors Research Laboratories

DR. F. A. ROHRMAN, Michigan College of Mining and Technology

MR. F. F. OPLINGER, E. I. du Pont de Nemours & Co.

◆

Reservation for table of ten may be had by sending check in amount of $30 to Chas. R. Beaubien, 13919 Robson, Detroit.

Everybody Welcome **The Event of the Season**

This is a paid advertisement

NEW HAVEN BRANCH OPEN MEETING

New Haven Branch held its first open meeting of the year Tuesday evening, October 22, at the Sterling Chemistry Laboratory, Yale University. The guest speaker for the evening was Mr. Arthur Logozzo of the General Electric Company, Plastics Division, Pittsfield, Mass. Mr. Logozzo gave a very interesting lecture on "Chromium Plating of Plastic Molds"; he also had a number of very fine samples. There was a very large attendance—about 100 men.

After adjournment of the meeting, registration for the course was taken, and some 63 signed up for the course in Practical Electroplating, all of which forecasts a successful year. T. H. Chamberlain was Chairman of the meeting.

There was an innovation this year in the form of a dinner held for the members, before the meeting, at the Aschembroedel. It was quite successful, and it was decided to continue this in the future as an opening feature for the season.

It was also decided to have a special business meeting to take care of the loss of two of our officers—Mr. G. S. Krentel, Assistant Secretary and Mr. R. S. Gray, Librarian.

JOSEPH T. SULLIVAN, *Vice-President.*

PROPOSED SCHEDULE
GENERAL ELECTROPLATING COURSE
To be given at Sterling Chemistry Laboratory Of Yale University, New Haven, Conn.

Lecture No. 1
Generators. Motor generators. Rectifiers. Their use and operation.
Instruments. Rheostats. Volt meter. Ammeter.
Bus Bars. Size and types.

Lecture No. 2
Equipment. Plating tanks. Various types of construction with particular use.

Lecture No. 3
Polishing and Buffing. Hand and Automatic.

Lecture No. 4
Cleaning Cycles and Equipment.

Lecture No. 5
The Deposition of Nickel. Dull and Bright Nickel.

Lecture No. 6
The Deposition of Chromium.

Lecture No. 7
The Deposition of Silver.

Lecture No. 8
Barrel Plating of Copper, Cadmium, Brass and Nickel. Ball Burnishing and Rolling.

Lecture No. 9
Precious Metal Plating: Gold, Platinum, Rhodium, Palladium.

Lecture No. 10
The Deposition of Black Nickel.

Lecture No. 11
The Deposition of Zinc and Tin.
The Plating of Die Castings.

Lecture No. 12
Oxidizing and Coloring of Metals.

Lecture No. 13
The Protection of Metallic Surfaces By Use of Lacquers. Various types of lacquers, their use and application.

Lecture No. 14
Plating Control.
Analysis of Solutions. Determination of thickness of deposited coatings. Equipment and its use.

PLATER VS. CHEMIST

The straight-from-the-shoulder editorial by A. Mankowich in the October REVIEW giving his views on the suggested curricula for platers by Dr. Young should be read seriously by every practical plater. It seems to me that Mr. Mankowich has clearly outlined the changed position of the average plater in our industrial set-up. I, myself, have maintained for several years past with, I must confess, plenty of disagreement, that we must concern ourselves primarily with production.

Some of our old-time platers, hanging on to the outmoded status quo of mystery, are writing and talking (and weeping) about the past prestige of the plater. The plater of today need not develop any inferiority complex over this changed status but merely accept it as the true American March of Progress.

Since the advent of chromium followed by bright nickel, bright copper, and now bright brass not to mention high-speed cadmium and zinc, the efficiency range of electrodeposition has been narrowed almost to the vanishing point as far as a nontechnical man is concerned. We, as platers, must recognize this and the technical man should be made aware of our hostility to any capitalization of our ignorance of, for instance, the fixation of nitrogen.

That there is some friction between the technical man and the plater I am sure is well known. However, why it is so is not so generally understood. I must confess I am not too clear on it myself. I think that when management generally recognizes the responsibility of the plater within the limits of an accurately controlled solution (controlled by technical men), this friction will disappear and after all the plater has the best end of the deal as management will always be far more concerned with production than the intricacies of pH in a nickel solution.

We practical platers must give full credit to the technical man for the truly remarkable advances made during the past ten or fifteen years, all we have had to do is put their discoveries into production. I well remember a number of years ago a very well-known plater of today and myself used to retire very mysteriously to an upstairs room in a certain plant on a Sunday morning (when we should have been in church perhaps) and go through what we thought was the intricate method of nickel determination then known as the "Vay Way Control." I am sure we thought then that a Ph. D. was the least title we should get and I think there are some platers who still have the same idea.

We must realize that the plater and the technical man have much in common but that the two, though related, are far apart. Practically all the new processes have as part of their installation a simple method of analysis with standard solutions that can be purchased anywhere. These standard solutions can, moreover, be put up by the plater himself if he feels it is lowering his prestige to buy them. I personally make my own standards.

Any course of instruction for platers must take all these factors into consideration and I am sure Mr. Mankowich is quite correct in his analysis of a course of study for the plater.

GEORGE SIMMONS

NEW CHICAGO OFFICE AND WAREHOUSE FOR DETROIT REX

The Detroit Rex Products Company, manufacturers of degreasing machines, solvents, industrial alkali compounds and dry cleaning equipment, have moved their Chicago office to larger quarters at 1166 West Cermak Road. There will be an equipment display room and complete warehouse facilities where stocks of degreasing solvents and alkalies will be maintained for quick delivery in the Chicago region. Field sales and service engineers and a permanent resident design engineer are employed.

The midwestern states are all served from the Chicago Office as a control center with branches in Milwaukee and St. Louis. Stocks of solvent are also carried in these branche offices for prompt out-of-state delivery.

CELEBRATE 50th ANNIVERSARY

Mr. C. B. Robinson, president, and Mr. W. F. Torrey, secretary and treasurer of the J. B. Ford Sales Company, look on as Mr. E. L. Ford, president of the Michigan Alkali Company, cuts the huge birthday cake symbolizing the famous chemical company's golden Jubilee celebration at Wyandotte, Mich.

HECTOR SEZ

L. K. Lindahl (Lindy), we believe could sell ice boxes to Eskimos after we listened to his talk about rectifiers at our last meeting.

Our secretary is getting to be Jack of all Trades. He reads the minutes, collects dues, operates the movie projector, and distributes proceedings, all in one evening.

We learned of another hunting trip similar to last year's. Lindahl takes first prize as the marksman with Mr. Awkerman second. Mention alfalfa to Jimmie Higgins and he is dead tired. It seems he walked through alfalfa up to his neck all day hunting for pheasants. Mose Cherry ate so much it kept everybody so busy passing food to him that no one could eat until he was filled.

We wonder if Jimmie Higgins will have his picture taken with all the game shot, and what he will tell the game warden.

Also, we wonder if the boys went out to hunt or just to eat the fried chicken that Carl Heussner provided, as the host.

Business and Social News

BRANCH NEWS

Educational Activities

AMERICAN ELECTROPLATERS' SOCIETY

Waterbury Branch met October 11 in the Colonial Room of the Hotel Elton. Dinner was served at 6:30, twenty-one members being present. As previously announced, at the conclusion of the dinner a drawing was held from the postal cards returned. Strange to relate, the secretary's name was drawn by Mr. Norman Prince, this being the first time to his knowledge that the secretary ever won anything, particularly a free dinner. At eight o'clock the meeting was called to order by President Ellsworth Candee.

The December meeting will be held jointly with the Hartford Branch at the Hotel Elton. Dr. Jesse Stareck of the United Chromium Corporation will be the speaker, and it is hoped that everyone will make a special effort to hear a very interesting talk.

Monday, October 21, a meeting was held in the Research Laboratories of Underwood, Elliott, Fisher Company. There was a tour through the laboratories with an inspection of the various research projects including electroplating, which laboratory is fitted up with very modern equipment. After the inspection tour there was a round table discussion on various electroplating subjects.

Dr. George Dubpernell reviewed a book entitled "Anodic Oxidation of Aluminum" by Dr. A. Jenny. This book is a recent English translation by Winifred Lewis from the German, and it details both the British and the German practice very completely. It covers the dyeing of anodic films, and there are also several chapters which really make it a text book on electrochemistry. However, the usual American practice is given only very briefly.

Everyone present was surprised and pleased to learn that Mr. and Mrs. William Gray and Mr. and Mrs. Earle Ball were celebrating their 35th wedding anniversaries together at Atlantic City, and it was decided to send the congratulations of the Branch to them.

The meeting was then turned over to Earle Couch as technical chairman. He introduced Mr. Norman Prince, a member of the Binghamton-Syracuse Branch, and sales manager of the Scobell Chemical Company. Mr. Prince had for the subject of his talk "Water in Industry." Water, of course, is the prime factor in the creation and maintenance of life. Without it the earth as we know it today could not have existed.

Mr. Prince had some very interesting slides showing prehistoric plant life, in the early swamps, which of course is now found largely in the form of coal. As the conditions on the earth gradually changed, less water vapor was present in the air and we have gradually evolved to the type of life as we know it today. Through this period of time water has been the most important factor, and today continues to be so.

In industry, particularly in the electroplating industry, water is very important and the purity with which it can be obtained makes a great deal of difference in the products manufactured. Inorganic salts, suspended matter, and organic material alter the properties of water tremendously. Mr.

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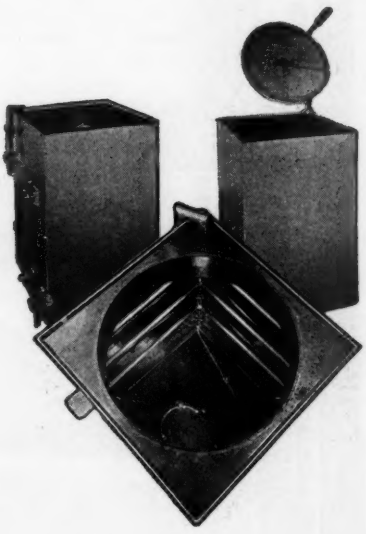

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[illegible]alists [illegible]uction of Clean-Working Buffing and Polishing Compounds

Prince cited the case of a paper mill in New York State where water from a shallow pond was being used in the beaters. During the summer months the pond was badly contaminated with algae. The authorities would not allow the company to drag the pond with copper sulphate for fear of killing fish. As a result, great difficulty was encountered in producing suitable paper.

The trouble was overcome by introducing a dam and flume in the brook feeding the mill. Copper sulphate was fed to the water at the head of the flume, killing this organic growth, and as a result the mill was able to produce paper better than at any time in its history.

Another instance was a plating shop established in a small town near Ithaca. Water was used from the public water supply of this town to make up nickel plating baths, cleaning tanks, and also to provide rinse water. While the water was beautifully clear and the people of the town had used it for domestic purposes for years, the plating plant immediately ran into trouble. Precipitates formed in the nickel solutions and in the cleaner and carried a smudge onto the work which could not be removed.

It was found that the water contained over 885 parts per million of total solids in the form of calcium and magnesium salts. Water was imported from Ithaca to make up new solutions, and while this Ithaca water still is not very good, nevertheless it was so much better that the trouble disappeared. Now all solutions are made from rain water which is collected from the roofs of the buildings. However, they still find it necessary to use the town supply for rinsing.

This same condition of hard water prevails all through this region. In Rochester, water of the Genesee river is largely used for manufacturing. This is largely used for manufacturing. This contains large amounts of suspended solids which cause other difficulties.

The state of Connecticut is for the most part quite fortunate in most of its water supplies. These waters are quite soft, usually containing not over 50 parts per million. But even in Connecticut there is possibility of difficulties from water, particularly where water from artesian wells or privately owned ponds is used without proper clarification.

It can be seen from these instances that water is indeed most important to the plater. Trouble which is difficult to account for may be due to some similar conditions and the water supply should be investigated.

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Mr. Prince was listened to with intense interest, and at the conclusion of his talk he was given a rising vote of thanks.

A business meeting was held at the home of Earl Couch on October 30.

SPENSER L. HENN, *Secy.*

Cleveland Branch received a kind invitation on Saturday, October 5, from the Dayton Branch to make a visit to the Mansfield, Ohio, Branch of The Westinghouse Electric Mfg. Co.

About 25 members took advantage of this invitation and met the Dayton Members at 10:00 A.M. at the office of the company where they were very cordially received by the Dayton Members.

We took a 2½ hour tour of the plant, followed by a very delicious chicken dinner which we all enjoyed. After the repast was over we were ushered into the auditorium and occupied some very comfortable chairs and were received officially.

Movies were then shown of the World's Fair with interesting highlights of the fair, followed by some practical talks on enameling and special processing.

That same evening our regular meeting was called to order at 8:30 P.M. at the Hotel Cleveland with 23 members present.

The applications of Mr. Edward L. Cabelac of The Weatherhead Company, Cleveland, and Mr. L. E. Hummel of The National Carbon Company, for active membership were received and turned over to the Board of Managers.

Mr. Scott then gave a report on the coming dinner dance to be held at Regnatz's, 3242 Warren Road, November 4, at 7 P.M. Mr. Costt, Mr. Singler, Mr. Ott and the secretary are prepared to supply tickets to all that desire them and a good time is promised for all present. A letter was sent to C. L. Van Derau and Mr. H. L. Farber of The Westinghouse Company of Mansfield and Mr. E. W. Cochrane of the Dayton Branch, thanking them for the pleasant trip and invitation.

Mr. John Honnecker, the librarian, then introduced the speaker of the evening, Dr. C. E. Ford, who gave a discourse on the physical properties of porous carbon and its use in the plating room.

He was ably assisted by Dr. Wilson, also of the National Carbon Company.

Dr. Ford told of experiments in the use of porous carbon tubes used in

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plating solutions to conduct air from the bottom of the plating tank to promote agitation. He also recommended agitation in rinse tanks by this method which gives a better rinse. Use of porous carbon in the filtering of solutions came up for discussion.

Samples of copperplated were work passed around showing various results by the use and absence of agitation.

While he acknowledged that this has been done in a great part along experimental lines, he expressed a desire to hear from platers and would promote efforts to find new uses for this material.

FRANK J. OPATRNY, *Secy.*

Anderson Branch held its regular meeting at the Y.M.C.A. on October 8.

The speaker of the evening, Mr. Gus Soderberg, technical director of the Udylite Corporation, gave a paper on *The Place of Rectifiers in Electroplating*. Mr. Soderberg very interestingly and briefly traced the steps and electrical considerations involved in the manufacture of a good rectifier, and then showed how the Magnesium-Copper Sulphide rectifying disc met the most desirable set of conditions. As the subject was further developed, the applications of rectifying units to jobs requiring smaller units of d.c. supply were emphasized.

As a result of Mr. Soderberg's paper and discussion, the branch felt that it appreciated to a greater extent the problems involved in the intelligent choice between a rectifier and a small generator.

The petitions for membership of Mr. W. R. Laux, Mr. W. W. Cothran and Mr. Russell Horton were returned from the investigating committee, voted on and accepted.

The branch closed its month's business by appropriating $10.00 as a gift to the Y. M. C. A. in its membership drive.

REX W. OYLER, *Secy.-Treas.*

Bridgeport Branch held its regular monthly meeting on Thursday, October 3, 1940, at the Stratfield Hotel.

President John E. Charleson opened the meeting at 8:20 P.M. with 29 members present. We had the pleasure of having Mr. W. J. R. Kennedy, our Supreme secretary-treasurer, and Dr. Beckwith of Indiana, at this meeting.

The final report of the Regional Meeting held at Waterbury was a success and the Bridgeport Branch was

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tendered a check for $49.16 as a result of taking part in this fine meeting.

The report of the Outing Committee was that a good time was had by all who attended. We were fortunate in having some outstanding men in the finishing industry attend this outing: namely, Supreme Society president, Mr. Fred Fulforth, and Mrs. Fulforth; Mr. Ellsworth Candee, Supreme 1st vice-president; and Mr. W. J. R. Kennedy, Supreme secretary-treasurer; and last but not least, our very good friends, Mr. George B. Hogaboom and Dr. Walter Meyer.

Application for Membership: Mr. Lawrence F. Griffin, Bridgeport Brass Company, as an associate member. Address: 50 Berkshire Avenue, City. Mr. Frederick A. Infield, General Electric Company, Schenectady, New York, has been accepted as an active member.

The Sick Committee reports Dr. Walter Meyer convalescing in the New Haven Hospital. The Society as a whole wishes Dr. Meyer a speedy recovery from his illness and particularly those who are grinding the axe on plating discussions. and who miss Walter's experienced comments on their plating problems.

Referring to Hobart Manufacturing Company's letter, it was voted not to give out names of the members of the Branch to any companies or manufacturing plants unless so voted by the Branch.

Mr. Clarence C. Helmle, our librarian, has secured Mr. Derick A. Hartshorn, Jr., Technical Director of the Enthone Company of New Haven, as our speaker for the October session. Mr. Hartshorn has as his subject "Wetting Agents and their Application and Control in Plating Solutions."

We had a very fine talk and demonstration by Mr. L. W. Reinken, Electrical Engineer of the W. Green Electric Company of New York, on "Selenium Rectifiers" on September 20, 1940. Mr. Reinken has told us of his experiences in the use of rectifiers in European countries and was one of the pioneers in the promotion of the selenium rectifiers for electroplating. The talk was very interesting and it seems that the discussion concerning rectifiers will be quite popular in plating circles.

The Branch then asked Mr. Kennedy to give us a talk which he obligingly

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did. Mr. Kennedy told us to devise ways and means to boost our membership by contacting manufacturing officials, engineering groups, chemical societies, etc., by having good speakers at our Educational Sessions, and writing to these groups to attend these sessions. Also an invitation was extended by Mr. Kennedy to the Branch to attend the Hartford meeting on October 21, 1940, which will contain a trip through the laboratories of the Underwood Elliott Fisher Company, including a Round Table discussion on Finishing. Convention Proceedings will be sent out before the end of the month. Mr. Kennedy asked that a list of any new speakers available for Branch meetings be sent to him for publication. The Supreme Secretary will also be glad to receive information about any vacant positions. Those who want jobs were asked to contact the Branch Secretary at once.

Dr. Beckwith of Indiana gave us a brief talk on methods and labor saving devices to accomplish the purpose of reducing costs by savings on the drag-out of solutions. This talk was very interesting and we all know that such savings can be accomplished if the method is put into effect.

President John E. Charleson then turned the meeting over to our librarian, Clarence C. Helmle, whose topic was "The Efficiency of a Zinc Solution using Zinc Anodes versus Zinc and Steel Anodes." The session was very interesting and was enjoyed by all members present.

JOSEPH G. STERLING, *Secy.-Treas.*

Buffalo Branch. The regular monthly meeting was held in Canisius College Friday, October 11, with President Joe Ruff in the chair.

The arrangements for a joint meeting with the Toronto Branch were left in the hands of Librarian Dr. C. J. Wernlund. It was also decided that we would hold a mixed bowling party in November.

We all learned with regret of the recent serious illness of Joe Post and we wish him a speedy recovery to his robust, happy old self again.

After the usual business was concluded the meeting was turned over to the guest speaker, Mr. W. Fotheringham of Devine Bros. His subject, "Buffs and Buffing," covered a wide field in this particular branch of the Plating Industry. Speaking on the construction of buffing wheels he gave a technical but humorous talk clearly demonstrating their features by samples. He explained their points and suitability for certain jobs. After answering questions he was given a hearty vote of thanks.

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Chicago Branch held its 342nd regular meeting at the Atlantic Hotel October 12, with President Longfield opening the meeting, and the other officers present.

It was announced that the speaker for our next meeting will be Mr. H. Leever of the Stutz Company, who will talk on "Modern High-Speed Cleaning of Steel."

Our librarian, Mr. Oscar Weickmann gave a very thorough discussion of the principles connected with wetting agents and how they affect the plating room, after which several comments by Mr. F. K. Savage, and others, were made on the subject.

It was voted that our December meeting be moved up one week to the 7th, to allow our members to attend the Detroit Educational Session on the 14th.

President Longfield announced that in addition to Mr. H. A. Gilbertson as General Chairman of the Banquet and Educational Session, the following were appointed on the General Committee: M. H. Longfield, C. Kelly, E. A. Lanz, F. J. Hanlon, G. Jelinek, O. E. Servis, R. J. Hazucha, C. S. Tompkins and J. Hay.

The Reception Committee was announced as follows: J. Bryden, C. Campbell, C. Clindinin, J. DeGrazia, W. Erskine, H. Faint, H. Gillis, R. Granquist, H. Hansen, O. Kocour, E. Lyons, V. Mattacotti, W. Meggers, R. Meyers, B. Nimick, F. Romanoff, F. Savage, H. Smallman, G. Spencer, E. Stenberg, A. Slater, E. Stepka, C. Stiers and E. Woodmansee.

The following questions came up for discussion:

Q. How much benzene di-sulfonic acid is used in a nickel solution, and how is it controlled?

A. Amount added, and control, determined by brightness of deposit.

Q. How much cadmium on steel will stand a 200 hour salt spray?

A. .00015 to .002 at significant surfaces.

Q. What will stop orange-peeling when buffing stainless steel?

A. Finer polishing to eliminate heavy buffiing; when workpiece heats, let cool while buffing another, then finish.

Q. What causes hot copper cyanide solution to pit? 125°F. pH 12.0 20 amps. sq./foot 3 volts.

A. Low cyanide suggested. Check to see if carbonates are too low.

Q. What plate or paint will protect sheet copper from dense sulfuric acid and hydrogen sulfide fumes?

A. Bakelite or asphalt varnishes.

E. A. LANZ, *Secy.-Treas.*

Dayton Branch. Saturday, October 5th, around twenty-two members trekked to Mansfield, to spend the day as guests of the Westinghouse Electric Company and Mr. C. L. Van Derau, a member of the Dayton Branch and Works Manager of this plant.

Our day began with a trip through the plant, which employs over four

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thousand people and is the one responsible for the manufacture, sale and distribution of Westinghouse Electric Appliances for the home, and has grown from a small place employing one hundred and twenty-five people in 1918 to its present size in the short space of twenty-two years.

Following the factory trip, the group, which included over twenty members from the Cleveland Branch, were served a luncheon in the Westinghouse Cafeteria.

This was followed by a program in the auditorium. Two motion pictures were shown and talks were given by several members of the Westinghouse staff.

At the short business meeting which closed this most enjoyable day Mr. Francis New and Mr. J. E. Ledger were elected to membership in the Dayton Branch and four new applications were read and voted to take the usual course. Mr. Cochran gave a short talk on the membership drive and I am sure that when the books are closed for the fiscal year the Dayton Branch will show a marked increase in membership.

CORLISS W. POWELL, *Secy.*

Detroit Branch. Dr. A. Kenneth Graham was the speaker at the October meeting. Abstract of the Paper entitled "Factors Affecting the Selection of Protective Metallic Coatings" is as follows:—

Plated coatings are obliged to withstand practically all of the corrosion environment met by metals and alloys, although the intensity of the environment in many cases is less for plated coatings than would be experienced with the pure metals or alloys. The most common forms of corrosion experienced by plated coatings are electrolytic in nature although some cases of pitting and corrosion probably exist.

The effects of the corrosion properties such as chemical activity of the metals, oxidation, solubility of products, composition and strains and of the rate factors such as acidity, films and temperature were discussed with respect to their influence on electrolytic corrosion.

It was stated that the difficulty of selecting protective metallic coatings arises because the corrosion environment is not constant and cannot be accurately defined. Abundant laboratory, outdoor exposure and service data form the only valid criterion upon which one can base a selection of protective metallic coatings.

The electrochemical series has frequently been interpreted too literally. The galvanic series of McKay and Worthington is believed to be a truer index of the relative activity of the metals and alloys. Even according to this classification copper nickel or chromium possess no intrinsic protective value when applied on a steel or zinc base die casting. Protection is obtained through the use of adequate thicknesses thus reducing porosity since both the steel and die casting would be anodic to the coating.

The advantage and the use of copper as an undercoat on steel or zinc base die castings was discussed. Other pos-

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sible alloys as a substitute for copper were also discussed and the requirements for any substitute for copper as an undercoat were outlined.

It was predicted that research in the future would be directed toward further reduction of porosity through improvements in the base metal and processes and through the evaluation of apparently more ideal metal or alloy combinations in an effort to improve protective metallic coatings.

A movie "Chemistry in the World of Today" was shown through the courtesy of H. W. Kennedy, E. I. du Pont de Nemours & Company representative. In this picture were explained some of the new developments in clothing, hose, and furniture.

Our next meeting will be held November 1 at Hotel Statler, and Mr. John C. Boyle, of the Udylite Corporation will talk on "The Place of Rectifiers in Electroplating."

For the information of other branch members, our annual Educational Session and Banquet will be held Saturday, December 7, at Hotel Statler. The Committee on arrangements would appreciate it if those planning to attend would write in early for tickets.

WRIGHT WILSON,
Secy.-Treas.

QUESTION BOX

Q. How does the corrosion resistance of a deposit composed of .001" of copper plus .0005" of nickel plus chrome compare with a .0015" deposit of nickel plus chrome?

A. No data was available which was directly applicable. It was thought that if the copper was buffed, the final nickel deposit would be smoother than nickel direct on the polished steel and that buffing the copper would tend to decrease the porosity of the nickel deposit. This would of course slightly favor the composite copper nickel deposit as a protective coating. The final finish required should be considered as well as the corrosion resistance.

Q. What may cause a cyanide copper solution to have a red color? Does this necessarily interfere with the satisfactory operation of the solution?

A. No satisfactory explanation was advanced for the red color. It was suggested that a treatment of activated carbon might remove this color, but this has since been disproved by the writer. The solution changed from a light cherry red to a wine red or violet of approximately the same intensity. A deposit from the solution appeared to be rather reddish in color but buffed very easily.

Q. Why does black nickel occasionally show a rainbow or iridescent cast on the surface?

A. Black nickel deposits are usually very thin and the theory was advanced that this phenomenon might be related to the well-known property of thin films to show interference colors.

Q. Why do dull nickel and barrel nickel plate in laminated layers?

A. Lamination of a nickel deposit is

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usually caused by a combination of two factors, first, the presence of the metallic impurity which will deposit by immersion on nickel, and second, an interrruption of the curent. When the current is interrupted, a very thin immersion deposit is very quickly formed which is non-adherent and when the subsequent coating of nickel is deposited over this, it tends to flake. In the case of barrel, decreasing the barrel speed is often helpful in preventing lamination because the current is broken less frequently as the parts tumble more slowly.

R. B. SALTONSTALL, *Librarian*

Los Angeles Branch. The October 9th meeting was opened by President Don Bedwell.

The minutes and financial report of the previous meeting were read. A correction in the minutes was noted in that Mr. Smith and Mr. Deets and not Miss Shelley will conduct the class in platers chemistry this term. The minutes and financial report were then approved.

A letter from Mr. Alfred Pritchard was read rescinding his request for a transfer from Rochester to Los Angeles Branch.

A letter from Mr. Fulforth was read. Following his suggestion it was moved and carried that the Board of Managers of Los Angeles Branch prepare a resolution, which, if approved by the Branch, will be submitted to the Boston Convention. This resolution to call for the election, by the branches, of a branch 2nd vice-president in charge of branch exhibits.

The application of James A. Roberts for associate membership was read and turned over to the Board of Managers for investigation.

After the introduction of visitors, Mr. Carlyle, of the Pacific Railway Equipment Company was introduced. Mr. Carlyle gave a very complete and interesting talk on "Electrolytic Polishing of Metals," speaking from his own experience as well as historically.

Mr. H. Kroesche read a paper by Mr. P. R. Pine of the Harshaw Chemical Company on "The Plating of Die-castings."

The Librarian, Mr. Holman, found the following questions in the Question Box:

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Q. What is the time required to plate .001" Chromium? 240 gr. per. li., Cr. Temp. 115°F. 100A. per sq. ft.

A. Approximately 5 hours. Suggested that Cr. concentration be raised to 55 ounces per. gal., current density be increased, and temperature be decreased.

Q. How can carbonates be removed from silver solution? Solution is 15 years old. Anodes are coated with carbonates. Ag. .3¼ ounce per. gal. NaCn. .4 ounce per. gal. Carbonates, .2¾ ounce per gal.

A. Du Pont carbonate remover.

ERVIN FRAUENHOFF, *Secy.-Treas.*

Montreal Branch held its regular meeting Thursday, October 3, in the New Carlton Hotel. The President called the meeting to order at 8.15, about 80 percent of the members being present. We had to make a change in the secretary's job. Mr. Willis, our former secretary having got into a nice new suit, we are not informed at the time of writing how long we will have to wait before we call him something besides his first name.

We then proceeded to make arrangements for our big night, Saturday, October 5. Then our good friend Mr. George B. Hogaboom delivered his talk on "What is under the plate?"

We had about 150 present. George was at his best. There was great interest in what he said and those who did not get all he tried to give by words got a lot of pleasure from the slides. The first act being over, the curtain went up for the last act, and what an act! George was just showered with questions. We can assure you that George sent the last man home satisfied. A thousand thanks, George, from the members of Montreal Branch.

JOHN FEELEY, *Secy.*

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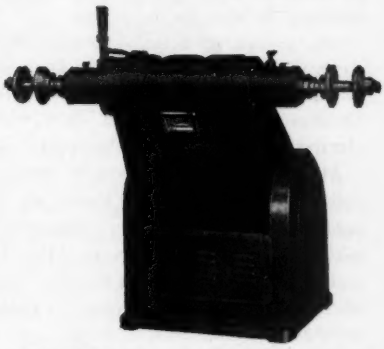

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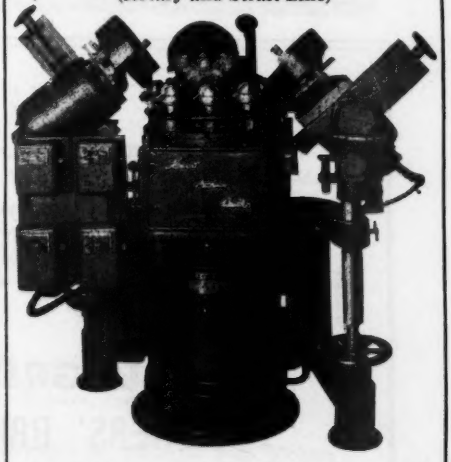

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Eastern Branch — 71 W. 23rd St., N.Y.C.

Newark Branch held its regular meeting on Friday evening, October 4, in the Club Room of the Hotel Douglas, Newark, N. J. The meeting was called to order at 8:30 P.M. with President William T. Maguire presiding.

Mr. Joseph A. Fusco was elected to Active Membership and Mr. Anthony J. Fusco, Mr. John J. D'Elia, John W. Dobson and Mr. Michael Tato were elected to Associate Membership.

Mr. Horace Smith brought up the subject of a Christmas Party to be held on December 20th in conjunction with the Ladies Auxiliary. All the members present were in favor of this idea. Mr. Smith was asked to make arrangements for such a party.

Mr. Louis Donroe, our Librarian, next presented as guest speaker for the evening, Mr. Nathaniel Hall. His subject was "Metal Pickling for Electroplating." Mr. Hall classified metal pickling in four different groups and gave a thorough explanation of each group, telling us why he has classed them as such. Mr. Hall's talk was very interesting and caused considerable discussion. He was given a rising vote of thanks by the 39 members present.

GEORGE WAGNER, *Secy.*

Rochester Branch held its Annual Clambake and Outing on Saturday, October 5, at the Summer Circle Spot, Ridge Rd., Rochester, N. Y. There was a very good turnout for this event which was started by a ball game between Elmer Nill's Yannigans and Fred Bruening's All-Stars. This game was won by the Yannigans with the able assistance of the umpire, Sylvester "Can't see 'em" Gartland. After the

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game several races were run off and everyone joined in and had a real good time. Liquid refreshments were served continuously during the game and the races and at 4:30 we all sat down to a really swell Clambake. A few more races were staged after the meal and then the party broke up with all expressing their satisfaction for a really grand time. At this time we wish to thank the following for their assistance in putting this party over with a bang: Fred Bruening of the Oakite Products Company, Ray Berghold of Fred Gumm Chemical Company, Joe Dutton of The J. B. Ford Company, Cecil Trembicki of the MacDermid Company, Mike French of the Lustre Chemical Company, Emler Nill of the Hickok Manufacturing Company, and Ralph Walker of the Scobell Chemical Company. To all these and all others who helped make this party a success, our hearty thanks.

On Friday night, September 20, the Rochester Branch held its regular monthly meeting at the Seneca Hotel. The meeting was presided over by President Gartland. Routine business was handled. The Educational Chairman, Mr. Phillip LoPresti reported and requested that a committee be appointed to sit with him and discuss plans for this season. The following were appointed to this committee: Mr. Polvino, Mr. Tufts, Mr. Schenkel and Mr. Treadwell.

On Friday night, October 4, the Executive Board held its meeting. Plans for the Educational program were submitted and accepted. The application of Mr. Nicholas Ribaudo, 495 Maple St., Rochester, N. Y., for an active membership was read and ordered published. The meeting was then adjourned.

JUDSON R. ELSTER, *Secy.*

St. Louis Branch held its regular meeting October 4, at the Central Y.M.C.A. Dinner was served to twenty members.

Mr. G. B. Daw acted as chairman.

Three applications for membership were received: Walter B. Ellis, Jr., 1919A Park Ave., St. Louis, Mo.; Sherman M. Goble, Jr., 26 Parkland, Glendale, Mo.; Arthur G. Bignall, 2822 Lasalle St., St. Louis, Mo.

Mr. Musick reported that there were men working in plating rooms that were not members of the society, and suggested that everyone take it upon himself to get a new member. Prof. Hanley from Rolla School of Mines was in attendance and was called on for a few remarks.

Mr. John Vogt had a paper on *Polishing Stainless Steel Electrolytically* and showed some very fine samples of the work he was doing. We also had a question box. One question asked was, "*What is pH?*" Mr. Errington was called to answer. He gave a brief talk on pH. Prof. Hanley also made a few remarks in regard to pH. Another question was, "*What is the best strip of nickel from die castings?*"

Mr. G. B. Daw then showed moving pictures tht he had taken at the picnic in New Athens, Ill. They were very good and showed everyone that was there. Sure was swell, Bert, thanks.

C. MCGINLEY, *Secy.*

San Francisco Branch held its regular meeting, Tuesday, October 8, at one of San Francisco's famous eating places. At this dinner meeting the good news was received that this branch is in third place in the membership drive. Every effort will be made by our membership committee to keep up the good work.

Plans were made for a whist party to be held next month. Mr. Stone

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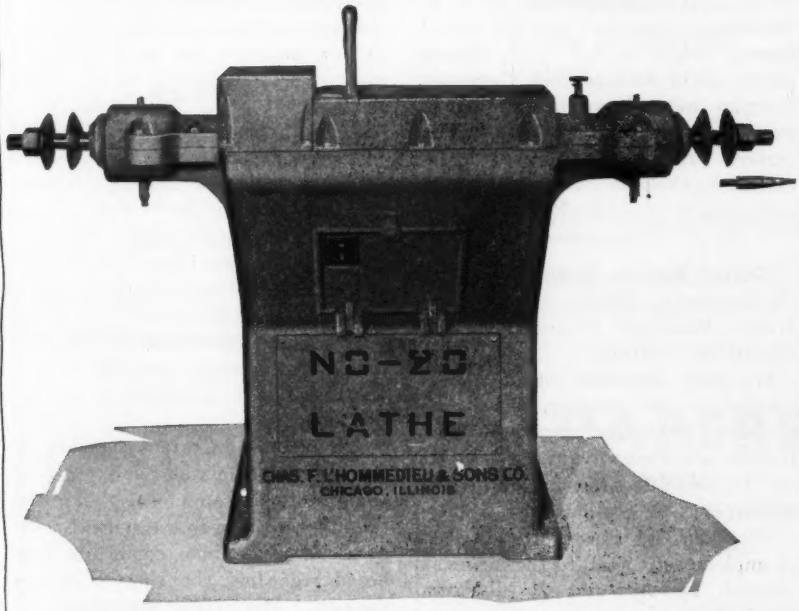

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was named chairman of the committee. Mr. Leather of Lea Manufacturing Company, Waterbury, Conn., was extended an invitation to speak before our branch when he visits this city.

Bright nickel plating was the subject for discussion and informative talks were given by Mr. A. W. Gerigk, head of the finishing department; Mr. C. R. MacDonald, chemist; and Mr. W. P. Stone, bright nickel and chrome plater; all of Schlage Lock Company. Samples were shown in the various stages from brass and bronze to finished chrome. Afterwards a general discussion was held, in which all took part.

W. P. STONE, *Secy.*

Grand Rapids Branch held its regular meeting October 3 at the Rowe Hotel. President Maurice Caldwell opened the meeting.

We were fortunate in having as speaker for the evening, Dr. A. K. Graham, consulting engineer, from Jenkintown, Pennsylvania, who spoke on "Factors affecting solution of protective metallic coatings."

His talk was illustrated. Printed phamplets distributed to the members covered McKay and Worthington classification of corrosion. The meeting was then adjourned, after questions were answered by Dr. Graham. A buffet lunch was then served to members and guests.

C. E. ABEL, *Secy-Treas.*

Hartford Branch. A special meeting was held October 7, at the home of the secretary. A membership committee for 1940-1941 was elected at this time as follows: J. H. Donahue of the Abbott Ball Company, Hartford, chairman; Joseph Beloin, R. E. Hinchcliffe, C. A. Kohrs and A. J. Maynard.

Our regular meeting for October was held at the Research Laboratories of the Underwood Elliott Fisher Company at 56 Arbour St., Hartford, Conn., October twenty-first. Guided tours were taken through the model plating, lacquer, heat treating and chemical laboratories, and the Typewriter Museum. Life tests of business machines and sound study equipment were also shown. In these laboratories studies of new processes are made to determine their adaptability to plant production.

After the inspection we adjourned to a large meeting room where a round-table discussion of plating problems was held, with Jack Costigan of Springfield, Mass., acting as chairman. Assisting him were Henry Smith of the R. Wallace & Sons Company, Ralph Coltor of the chromium Corporation, J. H. Donahue of the Abbott Ball Company, and Joseph Sterling of the General Electric Company of Bridgeport.

A number of important questions relating to the plating and finishing trades were discussed by the board and then thrown open to the general meeting. Very favorable comments were heard regarding the success of this meeting. Much credit should be given to our own member, Mr. John Poor, head of the research laboratory, for his efforts in obtaining the facilities for this meeting. Also for the great amount of work necessary to whip the details into shape.

Our neighboring branches were well represented. First Vice-President Ellsworth Candee and Supreme Secretary W. J. R. Kennedy honored us with their presence and also spoke briefly. A total of one hundred forty-eight were in attendance. This was by far the largest group ever gathered at a Hartford Branch meeting.

APLEY N. AUSTIN, *Secy.*

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3.6—5.0 (nickel)	8.2— 9.7
1.9—3.4 (copper, nickel)	9.2—11.0
0.9—1.5 (copper, etc.)	11.0—13.1
2.6—4.1 bright nickel	(brass, copper, silver, cadmium, zinc, tin, and cleaners)

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PAUL FRANK

456 Fourth Avenue New York City

Newark Branch held its regular meeting on Friday evening, October 18, at the Club Room of the Hotel Douglas, at 8:45 P. M.

An application for Mr. Ernest Hinterleitner of the Frederick Gumm Chemical Company to Associate membership was voted to take the regular course.

Our president then appointed Mr. Horace H. Smith, as chairman of our coming banquet, scheduled for April 19, 1941. He next announced that our Second Annual Christmas Party would be held on December 20 at the Newark Elk's Club, following a short business meeting at our regular meeting place.

Our librarian, Mr. Louis Donroe, presented as the guest speaker for the evening, Dr. A. Kenneth Graham. His subject was "The Chemical Control of Rochelle Salts, Copper Cyanide Solutions." His talk covered practically every important point in a Rochelle salts copper bath, such as: the pH control which is of greatest importance; the metal contents; the free cyanide contents; the Rochelle salts contents; the carbonate contents and many other items which enter into the field of Rochelle salts copper baths. His talk was most interesting and at the conclusion he was given a rising vote of thanks. Meeting adjourned at 11 P.M.

GEORGE WAGNER, *Secy.*

Toronto Branch met on November 1 at the King Edward Hotel. After telling of progress made by the platers class, President Smith introduced Mr. W. Z. Berry of the Department of Trade and Commerce who spoke on the Precious Metals and Markings Act.

This act, so Mr. Berry told the members, came into being, not to retard, but rather to assist the dealers. It was put into force in 1909, and has been beneficial to the public by permitting them to know just what they are buying. Electroplated ware is marked E.P.; if any kind of metal is attached to the article, such as the feet or mounts, the initials of the metal are stamped after the E.P., clearly showing the quality of the article. For instance, the base of two-ounce silver per gross of steel spoons is stamped E.P. Steel; sterling silver is 925 parts of fine silver; gold is 24K and must be stamped according to the amount of gold in the article, down to 9K which is the lowest amount allowed if the article is classed as gold; half and half is not gold, according to the Act.

Mr. Berry also spoke on the difference in rolled gold plate, gold filled ware and gilt, flat ware, hollow ware and triple plate. He mentioned that Brittania metal must be 90% tin, and is the registered trade mark for the responsible dealer; that it is an offence for any dealer to say how long electroplated articles will wear; that the Act has teeth, inasmuch as the law is enforced. He answered many questions and received a hearty vote of thanks from the members.

Q. What is the pH of chromic acid?

A. No answer given.

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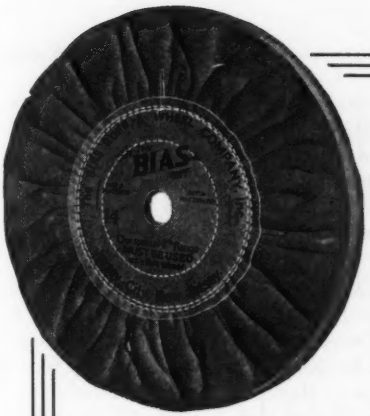

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Q. What is the best material to reduce excess sulfate in chrome solutions?

A. Barium carbonate.

Q. What is turpoline used for in the plating room?

A. Grease and oil solvent.

J. S. CAIRNS, *Secy.*

Baltimore-Washington Branch met at the National Bureau of Standards on Saturday, November 2. There was a good attendance to hear Mr. A. G. Pierdon lead a discussion on purification of solutions, and to see and hear a talking motion picture on "Celite," the well-known filter aid. The discussion turned largely on the filtration of nickel baths, concerning which there was quite a diversity of opinion. Doubt was expressed as to the utility of constant filtration and filter aids except for large-scale mass production.

Copies of the 1940 Convention Proceedings were distributed to the members, and they were received with much interest and approval.

As an innovation, our December meeting will be held in conjunction with a dinner, on which occasion our Research Associate, Mr. Lux, will be introduced to the Branch as guest speaker for the evening.

The membership committee promised to bestir itself to improve our standing in the membership campaign, which has been kept in the red by several recent resignations.

After the meeting, cider and doughnuts, served by our Librarian, Dr. Brenner, detained the members until Dr. Blum shooed then away out of consideration for the janitor.

C. T. THOMAS, *Secy.*

Boston Branch met Thursday, Nov. 7, at the Statler Hotel, with all officers present.

John C. Rich was elected a member. Three applications were read for the first time and turned over to the board of Managers for approval: James N. Kempt, 75 Lamartine St., Jamaica Plain, Mass., (Active), Harold F. Nash, 30 Grove St., Hopkinton, Mass., (Associate), and Joseph C. Burak, 71 Gore St., Cambridge, Mass., (Active).

Two were reinstated: Edward R. Grant, 38 Jamaica St., Boston, Mass., (Active) and Moorad Mosesian, 6 Orch Ave., Haverhill, Mass., (Active).

The transfer of Bert W. Sage from Buffalo Branch to Boston Branch was accepted. He will have plenty to do at the next convention.

The chair was then turned over to our Librarian Arthur Collins for the rest of the evening, a treat to be long remembered.

The Convention proceedings are ready for the members so come and get them. Members not able to get to the meeting can send a three cent stamp and the proceedings will be sent to you. Do this as soon as possible as they are going fast.

Refreshments were served after the speakers got tired, answering all the questions thrown at them.

A. W. GARRETT, *Secy.*

Report of Librarian

Boston Branch was singularly honored on the occasion of its regular monthly meeting at the Statler Hotel on Thursday, November 7, by the attendance of Mr. Frederick Fulforth, Supreme President; Mr. W. J. R. Kennedy, Supreme Secretary; and Mr. Joseph T. Sullivan of New Haven Clock Company, our invited speaker.

Mr. Sullivan presented a paper on "Gold Plating" which proved much more interesting than many had anticipated and which caused plenty of discussion among the more than eighty members present. Starting with the

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"dark ages," Mr. Sullivan sketched the history of gold from that time until the present day, touching on methods of reclaiming the precious metal and giving some of the uses to which it has been put. Confining his talk on actual gold plating to the patented Bek process of alloy plating, he explained the latter process in some detail, giving particular stress to the cycle of operations that preceded the actual plating of the alloy to the basic metal (in this instance, nickel silver). He explained how the alloy plate of gold, copper, nickel and zinc became an integral part of the basic metal by heat-treating and why, in order to build up a specified thickness of deposit, it was necessary to duplicate the entire procedure. His talk brought forth many questions from the listeners relative to current density required, cleaning methods; length of time required to deposit a given thickness; adhesion of the alloy plate. At the end, he was given an enthusiastic round of applause and many individual thanks for the paper. He has promised Mr. Kennedy a copy of it for publication in the MONTHLY REVIEW.

Mr. Fulforth, making his first official visit to Boston Branch since his election to the presidency, spoke briefly about the officers in the executive body and their willingness to cooperate in any way with the Branches; their aim to run the A.E.S. on a businesslike basis. He particularly lauded the type of men who make up the A.E.S. as a whole and pledged the wholehearted support of the body to Boston for the National Convention in June, 1941.

Mr. Kennedy, who is becoming almost as regular an attendant at Boston meetings as President Bill Jones, was heartily supported in his appeal that the younger members of the plating industry be given special consideration; that they be advised by their superiors in the plating room just why certain things were necessary and what happened when work was immersed in a bath. He was sure that if these younger men were really taught the fundamentals of plating and were given an interesting insight into the reasons for following definite cycles of operation, there would be a sharp decrease in the present rather large labor turnover in the plating room, and a corresponding increase in membership in the A.E.S.

A. W. COLLINS, *Librarian*

Dayton Branch held its regular meeting at the Engineers Club on Friday, November 1.

Mr. Cochran introduced our speaker for the evening, Mr. R. M. Shields of the Duriron Company of Dayton. Mr. Shields' most interesting talk was on the subject of "Duriron Equipment in the Plating Industry," and was illustrated by numerous slides showing the many ways which Duriron equipment made of corrosion-resisting alloys serves the plating industry. At the close of the question period following, Mr. Shields was given a vote of thanks.

At the business meeting which followed, Charles Fuchs, J. Gale Idle, Willis O. Park and Joseph M. Johnston, all of Mansfield, were elected to membership and the applications of Clifford Ryan, Herman Austen, and James Weaver were voted to take the usual course.

Mr. Conley, Mr. Harter and Mr. Suman were appointed a committee to express the sympathy of the Dayton Branch to Mr. VanDerau for the death of his mother.

At this time the meeting was adjourned until the first Friday in December.

CORLISS W. POWELL, *Secy.*

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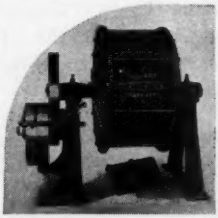

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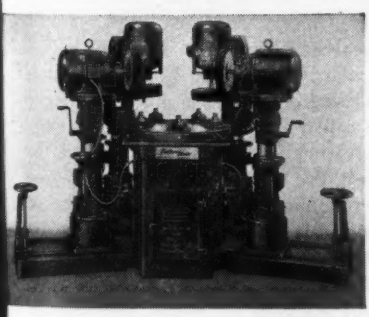

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Toledo Branch held its regular meeting on Thursday night, October 3. After some discussion, it was decided that this branch should not have a banquet at this time.

Mr. May revealed the names of the speakers that will appear on the program throughout the year, and the subjects they are to talk on, after which he introduced the speaker of the evening Mr. Pinner, who gave a very interesting talk on anode corrosion. He showed what effect pH, current density, and Cl concentrations have on anode corrosion, how the anodes were tested in his plant, and how different types of anodes behaved in solution under the same working conditions. He also had several slides showing how these anodes looked as they were being put through these different tests. The branch extended a vote of thanks to Mr. Pinner. The Detroit branch will have their annual banquet on December 7 and an invitation was extended to all the members and their friends to attend.

The application of Mr. H. J. McCracken for associate membership in the Toledo branch was accepted.

GASTON BERGEMAN, *Secy.*

Rochester Branch held its regular monthly meeting on Friday, October 18, at the Seneca Hotel. We had as our guest Mr. Wm. Kennedy, our Supreme Secretary who told us a lot about our Society and its activities. He told us that at the organization meeting of the Indianapolis branch fifty letters were sent out and FIFTY-TWO turned out for the meeting. Mr. Kennedy also stressed the fact that in order to keep our Society in its present fine financial condition it is absolutely imperative that everyone do everything possible to keep the ads coming in for our REVIEW. After his talk Mr. Kennedy was given a rising vote of thanks for the discourse and invited to come again soon and that didn't mean every two years but oftener. A little regular business was then transacted during which the application of N. Arthur Ribaudo was read and he was duly elected as an active member.

A special meeting was held on Friday, October 25, with Mr. Robert Sizelove of the Frederick Gumm Chemical Company as our guest speaker. "Bob's" topic was "Questions and Answers" and everyone agreed that he has a very original and interesting way in which to conduct a meeting. Instead of having a prepared talk Bob just starts a discussion by asking a question about one particular solution and then he has everyone asking and answering questions. In this way everyone joins in the meeting and a very educational time was enjoyed by all. Come again, Bob, at your earliest convenience. And many thanks to the Frederick Gumm Chemical Company in making it possible for us to enjoy your presence. During the course of the evening we were all very pleasantly surprised by the arrival of Jerry Lux along with Mr. Mason of the Exolon Company. Jerry, as you know is the Research Chemist at the Bureau of Standards for the A.E.S. and after Bob Sizelove finished with his talk, Jerry was called upon and gave us some very interesting sidelights on his work to date. We were all very happy to see Jerry again and wish him the best of luck in his work.

The following applications were read and ordered published.

Mr. Richard E. Waite, 614 Broadway, Rochester, N. Y.—Associate, Mr. Ralph Dettman, 105 Forgham Rd., Rochester, N. Y.—Associate.

We wish also to announce the election

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"4-A" Polishing Compounds Are Faster, More Efficient, More Economical for Polishing, Mirror Finishing of All Kinds of Steel, Including Stainless Steel and Other Alloys.

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Samples of Compound or Cement sent on request.

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of Mr. G. A. Lux as an Honorary member of the Rochester Branch.

The request of Mr. Alfred K. Pritchard, 426 Main St., E. Rochester, N. Y. to accept his resignation was received but we were unable to accept his resignation so therefore wish to announce his suspension as of this date.

JUDSON R. ELSTER, *Secy.*

Springfield Branch held its regular monthly meeting at the Hotel Charles on October 22.

The secretary announced the following feature speakers for the coming meetings: November 26, Mr. Arthur Logozzo, General Electric Company, Plastics Division, *Hard Plating on Plastic Molds*, Mr. Ralph E. Pettit, Aluminum Company of America, *Alcoa Aluminum and its Finishes.*

A letter from Mr. Arthur J. Mintie, chairman of the Exhibits Committee for the National Convention in Boston, was read. In accordance with his request, the Chair appointed the following members to serve on the Springfield Branch Exhibits Committee: Mr. I. D. Niles, chairman, Messrs. Arthur Hutchins and Arthur Logozzo.

Mr. Arthur Wood discussed the proposed educational program and outlined the course which is being conducted by the New Haven Branch. Further information will be available at the coming meeting and the branch will decide upon the type of course we wish to run.

The president then introduced Dr. C. B. F. Young, Director of the Metallurgical and Electroplating Institute, New York City, who gave us a very interesting talk entitled "Studies on Bright Nickel Plating Processes."

Dr. Young explained that the purpose of the paper was to correlate the advantages and limitations of the various bright nickel processes in order to assist finishing executives in selecting the process which will be better adapted to their specific type of work.

Dr. Young compared the various bright nickel processes and explained their main operating differences, illustrating his talk with photomicrographs.

In reply to an inquiry as to the cause of pitting, Dr. Young explained that the condition is aggravated by low pH and high surface tension. Under these conditions, particles of dirt or metallic impurities migrating to the cathode are attached and form a nucleus from which the hydrogen is discharged. As long as the surface tension is high, the hydrogen bubbles will continue to form and remain attached to the particle acting as a shield to prevent the deposition of nickel in that area.

D. S. HARTSHORN, JR., *Secy.*

Cleveland Branch. The regular meeting was called to order at 8:30 P. M. by President P. R. Lyons at Hotel Cleveland. We had some members present who have not been attending and also some guests, such as Mr. Stedell from the Anderson, Indiana, Branch, Mr. Green from the Detroit Branch and one of our own members, Mr. Carl Shoemaker from Coraopolis, Penna.

Mr. Singler gave a report on our coming dinner dance to be held at Regnatz's, November 16, and stated that members may have tables reserved if they wish.

Mr. John Honnecker, our librarian, then introduced the speaker of the evening, Mr. Carl Heussner of The Chrysler Corporation who gave a talk on the Story of Standardization. At the start of his talk Mr. Heussner was kind enough to distribute among the members present copies of "Engineering Standards" which were very much appreciated.

DARCO

Guards against

- **"Ghosts" in Plating Solutions**
- **Spoiled Plating**
- **Lost Production Time**

Darco, the activated carbon, successfully removes grease, oil, breakdown products, impurities resulting from decomposition of wetting or brightening agents, and other impurities that get into the plating solution.

Within a surprisingly short time, the entire plating industry has come to know the benefits of using Darco. This acceptance is reflected in a very gratifying growth of sales in the plating field, and in the number of leading distributors of plating supplies who carry Darco in stock.

Interest is also shown by numerous requests for the article—"Activated Carbon for Electroplating Solutions," and by the demand for members of our technical staff as speakers before local sections of the American Electroplaters' Society.

Write today for the article mentioned above. Order Darco S-51 from your supply dealer. Darco S-51, specially made for the electroplating industry, is packed in convenient 10-lb. and 50-lb. packages.

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DARCO

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Mr. Heussner covered various phases of standardization and the uses for plated parts; as some parts plated for protection against corrosion (zinc is sometimes used); and the question of how much zinc to use to serve the purpose and yet make it economical where large numbers of parts are used, such as in the automobile industry.

Chrome is used where wear is the main object and also where a combination of wear, corrosion and looks is important. Tin is used on pistons, in which case wear, lubrication and corrosion resistance are required. At the present time there is a possibility of a shortage of tin and there is need for finding a substitute which is also economical for commercial use.

In writing up standards one of the important factors is the time element or in other words how long should the part be used and still be in presentable condition. Mr. Heussner stated that an automobile life is estimated from one to ten years and plate is applied with this in mind although conditions vary throughout the country but in this case the coating is applied that will do a good job in 90 percent of the country for that period of time.

Contrary to some viewpoints, stainless steel and plastics will not replace electroplating as long as the plater does a good job and by the establishment of standards this will be a help in that direction.

He also touched on the plumbing industry and household appliances. Standards here are not what they should be and lead to disappointment where it is the most noticeable. However, he says that there has been a decided tendency toward more plate.

Mr. Heussner then discussed the various types of plating, some of them good and what made them good. Zinc, nickel and tin protect by covering. Platinum could be used for a competitor of chrome if it were not for the cost. Palladium also could be used but the cost is too high. Cadmium is always used on electrical contacts.

Specifications for *life tests* of plating are made in comparison to paint life. The salt spray test is used to check life of plate. Bumpers, for example, are tested for 100 hours. Indications of a good plate are a plate that does not have too many pores, no dirt in plate, is ductile and will not crack.

Mr. Huessner stated that tests show that roof exposures in Detroit on die-cast parts are more severe than any other part of the country except Pittsburgh. This is a coat of copper, nickel and chrome on die cast. New York City, Pittsburgh, the East Coast and St. Louis are more severe on plated steel parts.

This talk was followed by questions of the members. After a rising vote of thanks to Mr. Heussner for his very instructive talk, the meeting was adjourned.

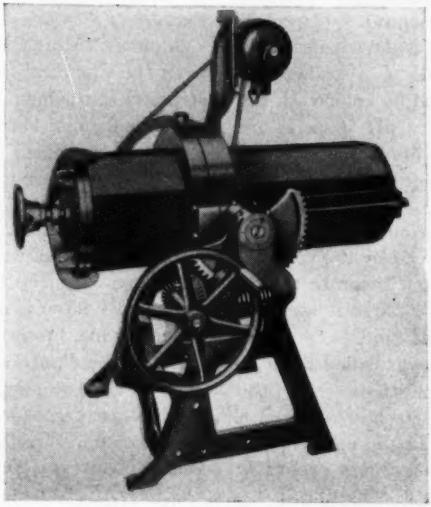
FRANK J. OPATRNY, *Secy.*

Buffalo Branch held its regular monthly meeting at Canisius College, on Friday, November 8, with President Joe Ruff in the chair. A financial statement was given by Mr. Frank Nowakowski. The President introduced the guest-speaker, Mr. C. E. MacKinnon of the du Pont Co. Mr. MacKinnon had for his talk "The Significance and Determination of pH." This subject is of paramount importance to platers as the quality and success of plating are directly dependant on its control. Especially was this so in nickel solutions, the pH of which must be kept within a certain specified range. If the pH is too low, brittleness and streaks caused are and if too high dark

Lasalco Burnishing Barrels

V BELTS

MOTOR DRIVE



ROLLER BEARINGS

TURN WHEEL TO TIGHTEN COVER

BALANCED LOAD

SPIN HAND WHEEL TO RAISE OR LOWER CYLINDER

RUGGED FRAME

LASALCO, INC.

2822-38 LASALLE ST.

ST. LOUIS, MISSOURI

streaking, non-adherence and brittleness will result.

pH could be measured from 1 to 14 units. Taking the pH of distilled water as 7, the acidity or alkalinity of a solution could readily be determined—between 1 and 7, acidity was indicated, and from 7 to 14, alkalinity.

In general plating practice there were two methods of pH measurement. First by the colorimeter or by pH papers. These were rough-and-ready ways but could be used where extreme accuracy was not essential. The colorimeter was simply a device in which chemical compounds of a known pH value were compared by color with the solution concerned. pH papers are papers containing salts which react on immersion in the solution. The second method was by the electro-metric apparatus the operation and function of which was explained by the speaker. This would give very accurate results and within a certain range it was correct to 2/100 of a pH unit.

Mr. MacKinnon was called upon to answer various questions from the members and after he had received a hearty vote of thanks the meeting was adjourned concluding a very profitable evening. RODERICK MCGHEE, *Secy.*

Detroit Branch. Our librarian tried a new question and answer idea on the members, patterned after the radio programs which are heard so often. Prof. E. M. Baker, C. F. Nixon, B. F. Lewis, and L. K. Lindahl were the "answer men," and proved to be 100% successful on the questions the members asked.

Our speaker of the evening was Mr. L. K. Lindahl, of the Udylite Corporation, who spoke on "The Place of Rectifiers in Electroplating." He also brought one of the rectifiers along so the members could see what they looked like.

A movie "More than Meets the Eye" from the Chemical Foundation was instructive to the members on the making of colors for ink, varnish and cloth.

In case members of other branches wish to come to our Annual Banquet and Educational Session, on December 7, at Hotel Statler, they will be welcome. A word of warning, however,—there are only 750 tickets to be sold because we havn't room for any more. So first come, first served; and the last one will be "out of luck" as far as seats at the banquet.

The speakers for the educational meeting are Dr. Kettering, of the General Motors Research Laboratories, Dr. F. A. Rohrman, Michigan College of Mining & Technology, and Mr. Floyd Oplinger, of E. I. duPont de Nemours & Co. W. W. WILSON, *Secy.*

HECTOR SEZ

Dr. Graham certainly can give the boys "food for thought" when he is the speaker of the evening. Every one of the hundred and fifty present was sitting up in his chair and paying attention. Looked to Hector as if he was in a class room at college.

Talking about Professors,—there is a story about the absent minded one who makes bets on Cleveland in the 1940 World's Series. I wonder if it could have been E. M. Baker?

Plans are already being formulated for the Detroit Branch December Banquet to be held Saturday, Dec. 7th. The Committee even expects a bigger program than last year—if that's possible. Hector has heard that the men will rate favors this year as well as the ladies.

There are a lot of new things in chemistry as shown by the duPont movie "Chemistry in the World of Today." Some of the dresses, hose and other materials certainly looked better to Hector's eyes than the stick of wood, and glass of water they were supposed to be from.

FINER CLOTH INCREASES PERFECT PRODUCTION

American Buff Corporation, Chicago, now employs a finer and more finished cloth in the making of their buffs. This new cloth yields more perfect production in buffing and polishing operations, and contributes still more dollars and cents value by allowing less waste.

ROCHESTER BRANCH EDUCATIONAL COURSE

First Term 1940-41 Season. Meetings will be held every Friday night. Every fourth Friday a speaker will discuss subject of previous three weeks.

The meetings will start promptly at 7:30 P.M. Speakers will start at 8:00 P.M.

November 15. Mr. Tufts. — Electroplating Equipment.
November 22. Mr. Lo Presti. — Business Management.
November 29. Mr. Hendershot. — Solution Analysis.
December 6. Speaker to be announced later.
December 13. Mr. Treadwell. — Lacquering and Enameling.
December 20. Copper Plating.
January 3. Nickel Plating.
January 10. Chromium Plating.

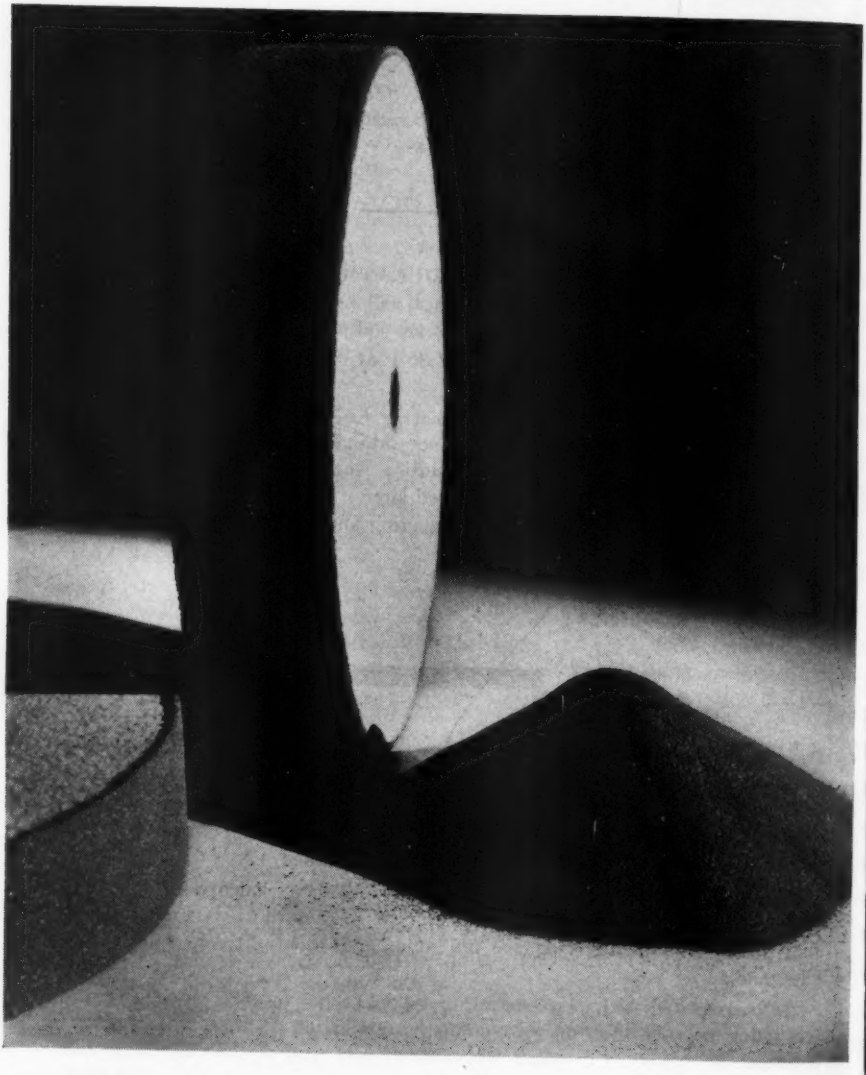
Charles L. Allen

Succumbs to Bronchial Pneumonia at Worcester Home— Was General Manager of Grinding Concern 48 Years —Active in Civic Enterprises

Charles L. Allen, 82, dean of Worcester industrialists, chairman of the board of Norton Co. and its general manager for 48 years until his retirement from that post in 1933, died Nov. 3 at his home, 6 Academy Street, of bronchial pneumonia.

He had started with Norton Co. as a bookkeeper in 1881 when it was a struggling pottery shop on Water Street, employing 13 men where an experiment in making a grinding wheel eventually lead to the vast factory in Greendale and world supremacy of the company in its field with over 6000 workers.

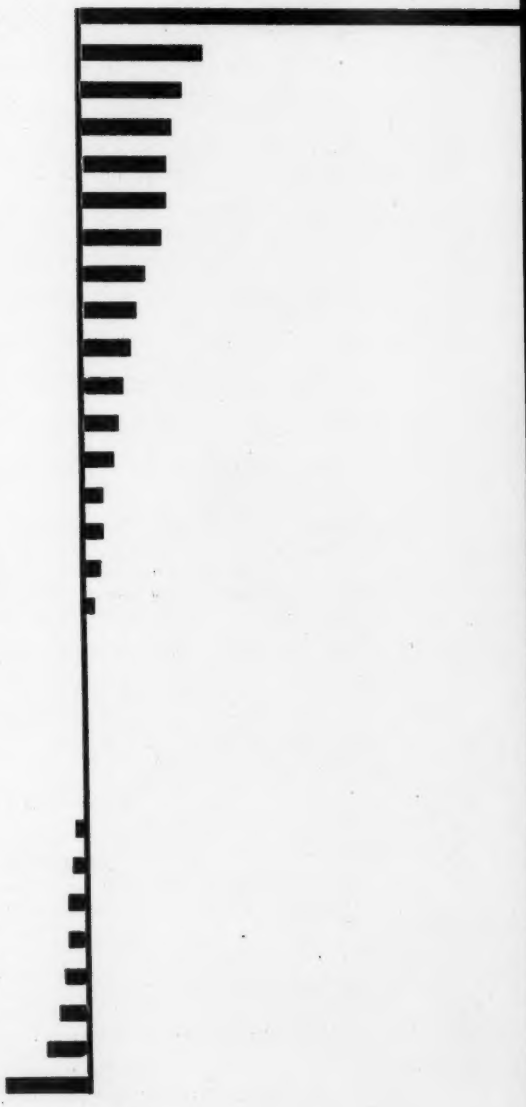
We are unable to publish several items of branch news, the Indianapolis list of members, etc., for lack of space. These will appear in the December REVIEW.



NORTON ABRASIVES

Membership Campaign

RANCH	May 1, 1940	Change in Member-ship	Percent Change
ancaster	25	+14	+56
rand Rapids	52	+8	+15.4
incinnati	36	+4½	+12.5
oston	79	+9	+11.4
nderson	38	+4	+10.5
ochester	62	+6½	+10.5
an Francisco	20	+2	+10
rov.-Attleboro	38	+3	+7.9
pringfield	51	+3½	+6.8
aterbury	66	+4	+6.1
leveland	70	+3½	+5
ayton	62	+3	+4.8
oledo	40	+1½	+3.8
ilwaukee	84	+2	+2.4
altimore-Wash.	49	+1	+2.2
ew York	102	+2	+2
hiladelphia	133	+1½	+1.1
ontreal	23	0	0
os Angeles	59	0	0
ing.-Syracuse	22	0	0
ewark	125	0	0
ew Haven	115	0	0
artford	45	—½	—1.1
etroit	250	—3½	—1.4
hicago	225	—3½	—1.5
ittsburgh	34	—½	—1.5
. Louis	77	—2	—2.6
oronto	67	—2	—3.3
ridgeport	71	—3½	—4.9
uffalo	57	—6	—10.5



OTE: Honorary members are included with each Branch.

Donald A. Hilliard, 169 Plaza Ave., Waterbury, Conn.
Associate, Waterbury Branch
Frank Passalacqua, 16 State St., Waterbury, Conn.
Associate, Waterbury Branch
Ernest Hinterleitner, 829 North Ave., West, Westfield, N. J.
Associate, Newark Branch
Angelo Amatore, Brooks & Co., New York, N. Y. Active, New York Branch
James Martin, Brewster Aeronautical Corp., Long Island, N. Y.
Active, New York Branch
George F. Hermann, W. L. Maxon Corp., New York, N. Y.
Active, New York Branch
Bernard R. Weber, 1912 S. 82nd St., Milwaukee, Wis.
Associate, Milwaukee Branch
Gail H. Templin, 16800 Griggs Ave., Detroit, Mich. Associate, Detroit Branch
Frederick Wagner, 1249 Holden Ave., Detroit, Mich
Associate, Detroit Branch
J. Gale Idle, 271 Helen Ave., Mansfield, Ohio Active, Dayton Branch
Willis O. Park, 121 Western Ave., Mansfield, Ohio Active, Dayton Branch
Joseph M. Johnston, 665 Brae Burn Rd., Mansfield, Ohio
Associate, Dayton Branch
C. H. Fuchs, 34 North Benton St., Mansfield, Ohio
Associate, Dayton Branch
Edward Ladimer Cableck, 2636 Taylor Road, Cleveland Heights, Ohio
Active, Cleveland Branch
L. E. Hummel, 17317 Franklin Blvd., Lakewood, Ohio
Active, Cleveland Branch
Lawrence F. Griffin, 50 Berkshire Ave., Bridgeport, Conn.
Associate, Bridgeport Branch
John C. Rice, 48 Edgehill Road, Providence, R. I. Associate, Boston Branch
W. J. Haltmeier, 71 West 23rd St., New York, N. Y.
Associate, Waterbury Branch
Nicholas Ribaudo, 495 Maple St., Rochester, N. Y. Active, Rochester Branch
Walter B. Ellis, Jr., 1919A Park Ave., St. Louis, Mo. St. Louis Branch
Sherman M. Goble, Jr., 26 Parkland, Glendale, Mo. St. Louis Branch
Arthur G. Bignall, 2822 LaSalle St., St. Louis ,Mo. St. Louis Branch
James N. Kempt, 75 Lamartine St., Jamaica Plain, Mass.
Active, Boston Branch
Harold F. Nash, 30 Grove St., Hopkinton, Mass. Associate, Boston Branch
Joseph C. Burek, 71 Gore St., Cambridge, Mass. Active, Boston Branch
Sylvester Charles Pearsall, 349 Pleasant St., Malden, Mass. Boston Branch

SUSPENSIONS

Lamoine Rutherford, Toledo Branch
August Minke, Toledo Branch
E. T. Fest, Buffalo Branch
E. E. Daucher, Buffalo Branch
L. E. Davy, Buffalo Branch

RESIGNATIONS

Clyde Piper, Detroit Branch
Isadore Nusbaum, Detroit Branch
Jack Crawford, Detroit Branch
Frank Wilbur, Detroit Branch

TRANSFERS

Leland M. Morse, Box 395, Hudson, Ohio from Cleveland to Detroit Branch
S. S. Johnston, 1321 Steele Ave., Steubenville, Ohio
from Philadelphia to Pittsburgh Branch
Ralph H. McCahan, du Pont Company, 350—5th Ave., New York, N. Y.
from New York to Bridgeport Branch
John M. Hosdowich, 66-20—108th St., Forest Hills, N. Y.
from Waterbury to New York Branch
George Muscio, 26 Stuyvesant Ave., Arlington, N. J.
from Waterbury to Newark Branch

REINSTATEMENTS

Edward R. Grant, 38 Jamaica St., Boston, Mass. Active, Boston Branch
Moorad Mosesian, 6 Orch Ave., Haverhill, Mass Active, Boston Branch